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DRAFT FINAL WORK PLAN FOR A

Remedial Investigation and Feasibility Study of The Picco Resins Landfill Jefferson Borough Allegheny County, Pennsylvania

JUNE 1987

Prepared For

Hercules Incorporated
Wilmington, Delaware

WESTON
MANAGERS DESIGNERS/CONSULTANTS

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SECTION 1

INTRODUCTION

1.0 GENERAL

Hercules, Incorporated (Hercules) has requested Roy F. Weston, Inc. (WESTON) to prepare a work plan for a Remedial Investigation (RI) and Feasibility Study (FS) to address possible remedial action at the Picco Resins Landfill in Jefferson Borough, Pennsylvania.

1.1 SITE BACKGROUND

The Picco Resins Landfill is located near the Picco Resins Plant in Jefferson Borough, Allegheny County, Pennsylvania (Figure 1-1). Between 1950 and 1964, the landfill received an estimated 77,000 tons of production wastes from the plant, mainly Clay Poly Cakes and Dechlor Cakes. A plan view sketch of the landfill is shown in Figure 1-2. No records exist of the waste generated; however, Figure 1-3 presents an estimate of total waste based on production estimates. Oily resin/solvent seepage from the landfill toe had also entered soils downslope of the landfill and a small stream that drains the area.

Hercules purchased the Resin Plant and landfill property in 1973 from Pennsylvania Industrial Chemicals Corporation (PICCO). Prior to 1980 Hercules personnel installed a leachate control system at the landfill toe to collect oily resin seeping from the landfill toe. This control system was only partially effective in stopping the leachate dis-

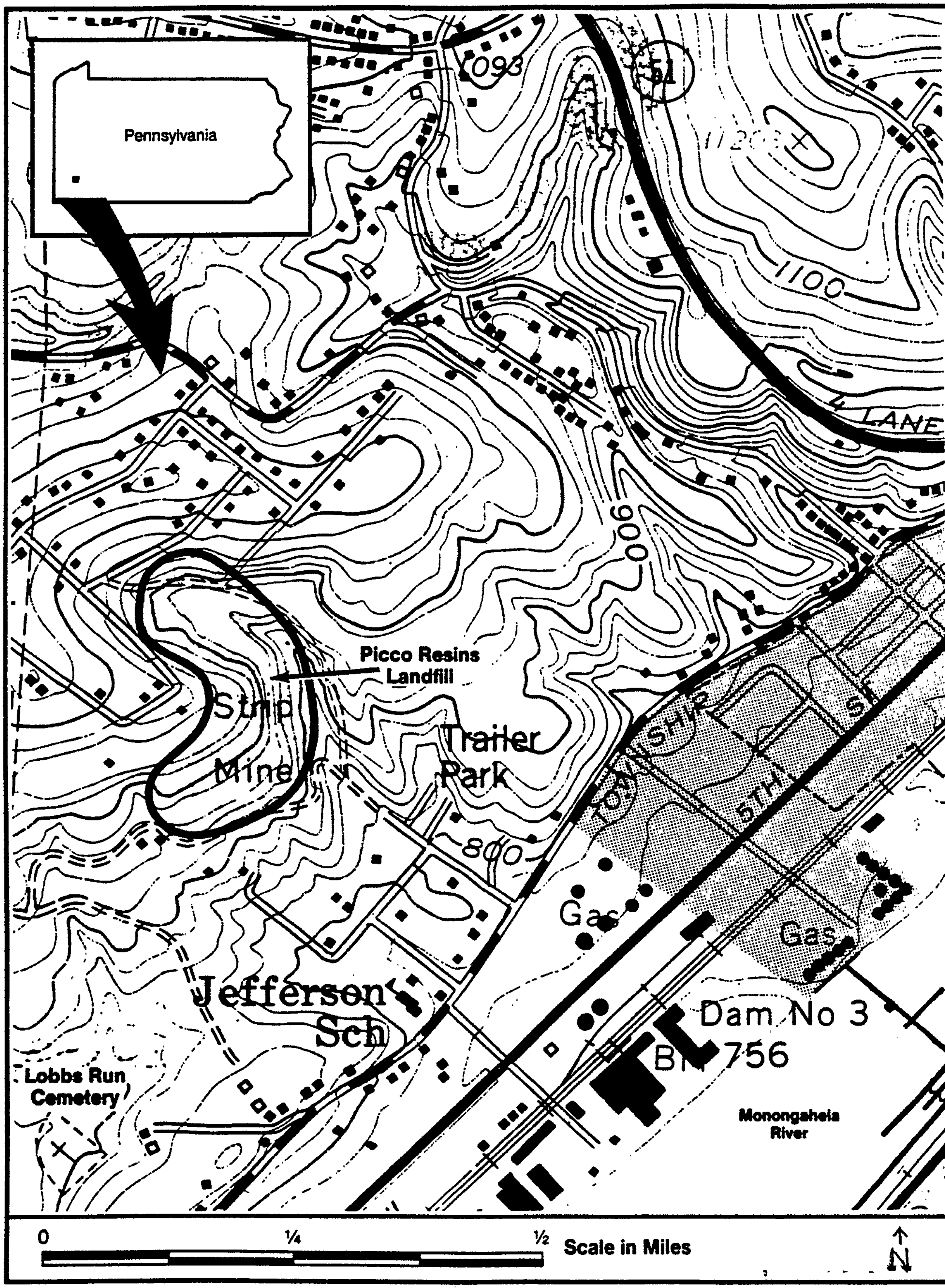

FIGURE 1-1 SITE LOCATION MAP

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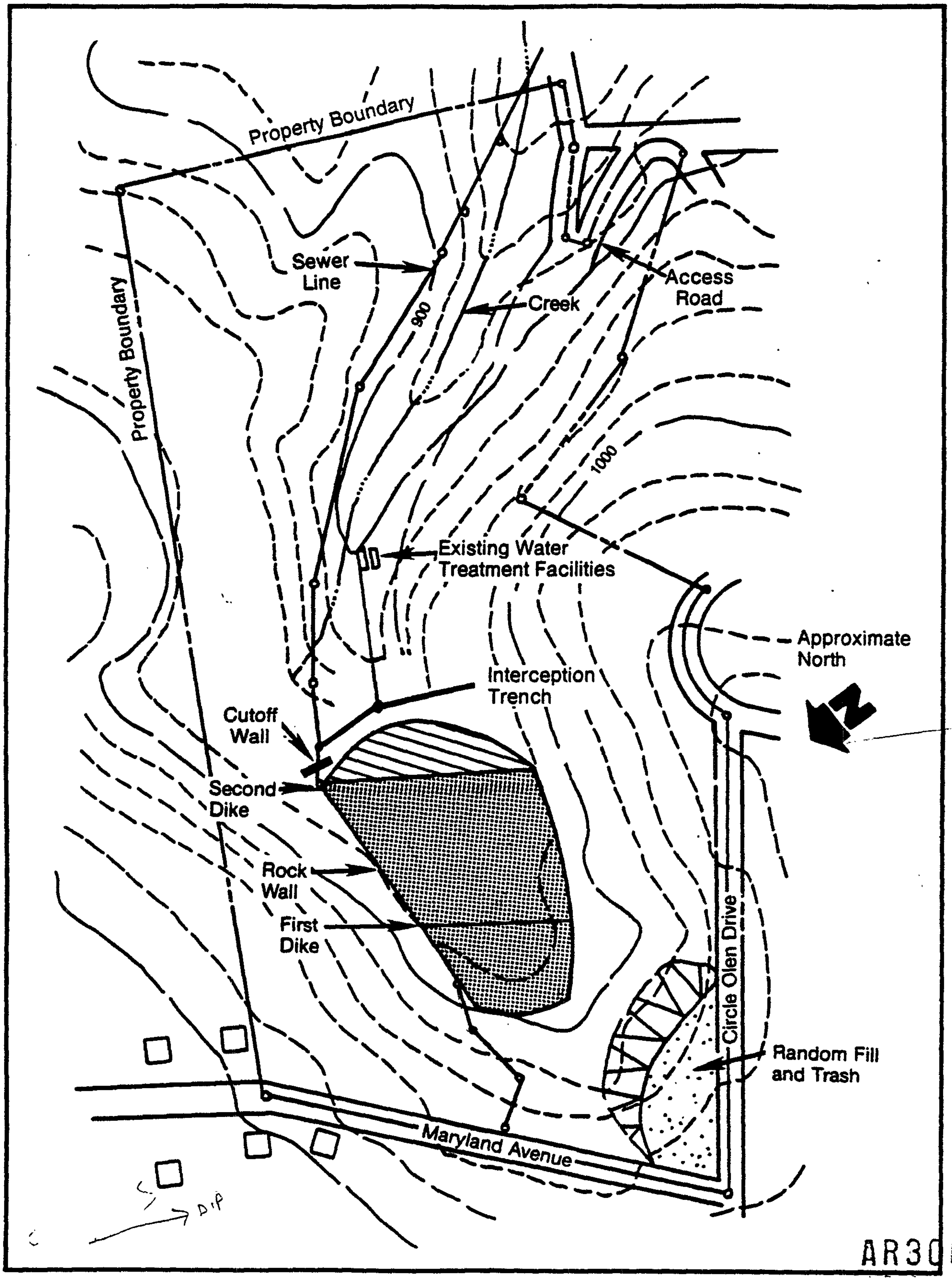

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FIGURE 1-2 SITE MAP OF THE PICCO RESIN LANDFILL, JEFFERSON BOROUGH, PA

charge. In February 1980, Hercules was notified by the Pennsylvania Department of Environmental Resources (PADER) that the landfill site was in violation of the Pennsylvania Clean Streams Law and Solid Waste Management Act.

In response to that notification, Hercules proceeded with an assessment of environmental conditions at the site. The scope and results of this investigation are discussed in Section 3.0 of this report. As a result of this assessment, Hercules recommended the installation of an interception trench and leachate collection system at the toe of the landfill. This system was installed, upon approval of PADER, during the summer of 1983.

(When did site become NPL site?)

In September 1985, Hercules was notified by the PADER that although the interception trench appeared to be an effective remedial action, certain questions still remained regarding the environmental impact of the site, particularly in regard to air quality and offsite migration of contaminants in soils and ground water. At a meeting between Hercules and the PADER on December 10, 1985, Hercules agreed to proceed with a complete Remedial Investigation and Feasibility Study (RI/FS) of the site. The RI/FS will determine whether additional remedial action is necessary and, if so, recommend an alternative to mitigate the situation.

1.2 PURPOSE AND SCOPE

The purpose of this work plan is to present a detailed plan for the collection and analysis of data and for the evaluation of remedial actions to mitigate the effect of contam-

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inants from the landfill on the environment. The final objective is to select the best combination of alternatives based on technical merit and cost effectiveness. The RI/FS will make maximum use of the data which has already been collected at the site and evaluate the performance of control measures which have been put in place.

The scope of this work plan includes a discussion of the site environmental setting (Section 2) and a summary of the hydrogeologic conditions at the site as determined by the field investigation to date (Section 3). The construction of the present interception trench and leachate collection system is discussed in Section 4. Possible contaminant migration pathways and additional data requirements are discussed in Sections 4 and 5 respectively. The proposed scope of the remedial investigation (Section 6) is intended to address the additional data requirements required to complete the feasibility study, outlined in Section 7.

SECTION 2

ENVIRONMENTAL SETTING

2.0 GEOLOGY AND PHYSIOGRAPHY

The site is located in southwestern Pennsylvania in the Allegheny Plateau physiographic province. The topography of this area is that of an eroded plateau with relatively level high lands dissected by narrow, deeply eroded stream valleys. The bedrock underlying the area is sedimentary in origin consisting of interbedded sandstones, shales, limestones and coal. The rock beds appear flat in outcrop, but in fact they gently dip in broad folds. Figure 2-1 presents a generalized stratigraphy of Allegheny County.

In the site area the Pittsburgh Coal is the most recognizable unit. Occurring at an elevation of around 950 feet above MSL, the unit is gently folded in the Murrysville Anticline which plunges to the south. The landfill site is located on the western limb of the anticline where the beds dip to the south or southwest, as shown on Figure 2-2. Figure 2-2 also shows the outcropping of the Pittsburgh coal along the valley slopes of the area. The landfill is located in an old strip mine site at the head of a narrow side valley or "hollow" which drains to the Monongahela River Valley a short distance away.

DEFINE

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The relative positions of many formations have been expressed below as vertical distances above or below the Pittsburgh and Upper Freeport coals, which are prominent features throughout much of the county because of the many mines associated with them. The distances are approximate, and the potential error increases as the vertical distance from the reference bed increases.

Relative Positions of Some Geologic Units in Allegheny County

Geologic Unit	Position
Washington Formation	550-750 feet above Pittsburgh coal.
Pittsburgh Sandstone	About 75 feet above base of Pittsburgh coal.
Pittsburgh coal	500-750 feet above Upper Freeport coal.
Upper and Lower Pittsburgh Limestone	Top is at base of Pittsburgh coal.
Connellsville Sandstone	30-60 feet below Pittsburgh coal.
Little Clarksburg coal and Clarksburg Limestone	80-100 feet below Pittsburgh coal.
Morgantown Sandstone	150-220 feet below Pittsburgh coal.
Ames Limestone	230-350 (average 275) feet below Pittsburgh coal, and about 350 feet above Upper Freeport coal.
Saltsburg Sandstone	170-285 (average 262) feet above Upper Freeport coal, and 300-500 (average 375) feet below Pittsburgh coal.
Buffalo Sandstone	450-510 feet below Pittsburgh coal.
Brush Creek coal	70-120 feet above Upper Freeport coal.
Mahoning Sandstone	420-600 feet below Pittsburgh coal and 100 feet above Upper Freeport coal.
Upper Freeport coal	500-700 feet below Pittsburgh coal.

Reference: Groundwater Resources of Allegheny Co. PA
Water Resources Report 35,
PA Dept. of Env. Res., 1973.

FIGURE 2-1 GENERALIZED GEOLOGIC CROSS SECTION OF ALLEGHENY COUNTY

(*) LOCATE INTERMITTENT STREAM ON THIS MAP

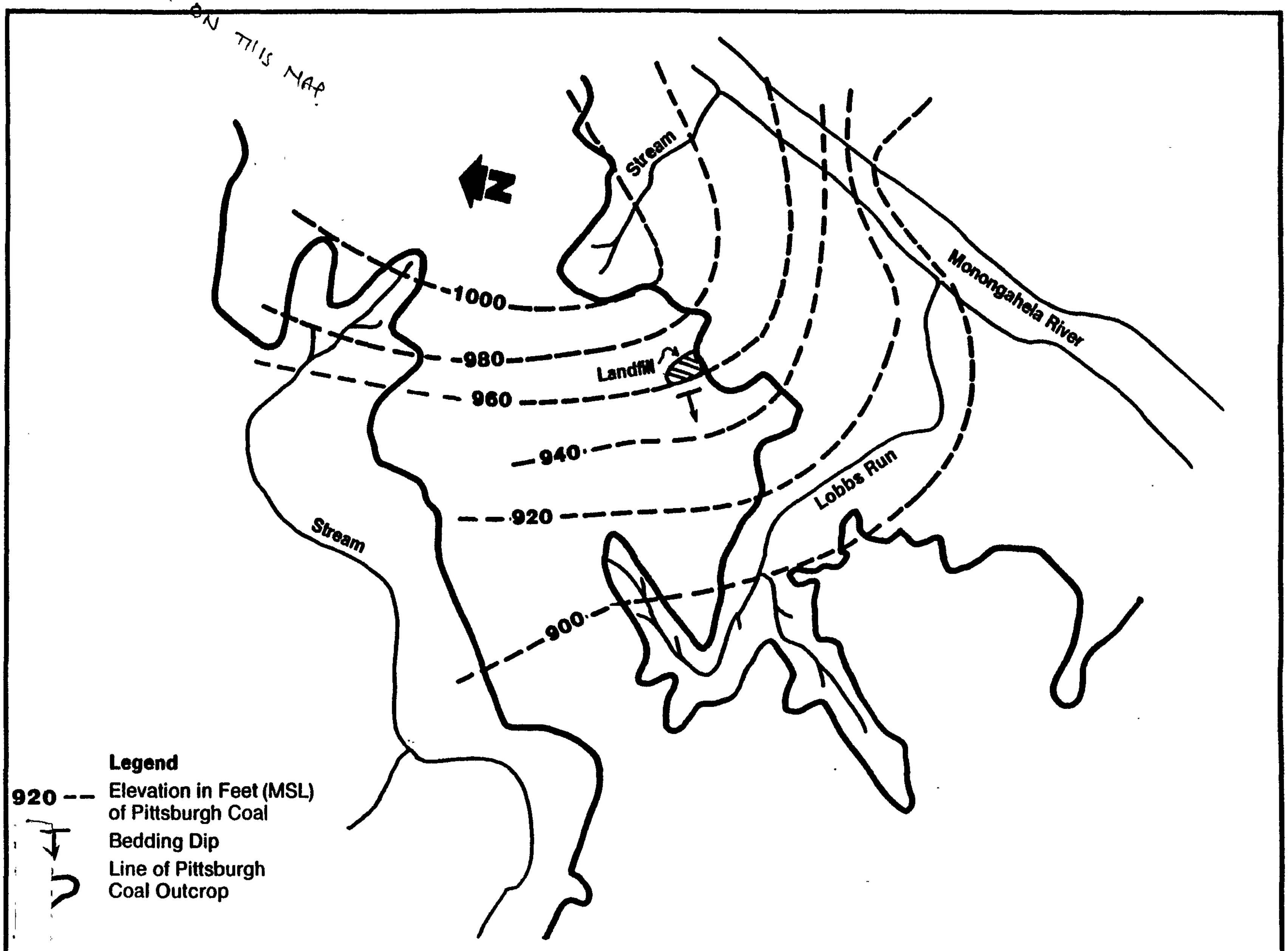

FIGURE 2-2 OUTCROPPING OF PITTSBURGH COAL (AFTER US BUREAU OF MINES PITTSBU[illegible] SHEETS NO. 7 AND 8.)

2.1 GROUND WATER OCCURRENCE

DOMESTIC, INDUSTRIAL, MUNICIPAL ? FIELD ?

The major ground water sources in the area are valley sediment aquifers in the larger river valleys. However, small supplies of ground water are sometimes found in porous sandstones and in fractured limestones and shales. Soils overlying relatively impermeable bedrock are often partially saturated, forming a ~~shallow~~ local perched water table. Ground water can emerge along steep valley sides in springs and seeps. In the site area no general use of ground water is made although occasional household wells are known to exist, but may or may not currently be used.

DEFINE RAN OF YIELD

The Pittsburgh Coal, being moderately permeable due to fracturing, also contains ground water although it is not potable. The ground-water flow in the Pittsburgh Coal tends to be in the bedding dip direction. Recharge occurs through permeable overlying rock and in outcrop areas where the beds dip into the hillside. Ground-water discharge through the overlying permeable rock occurs at down dip outcrops where the beds dip out of the hillside.

2.2 LANDFILL SETTING

A plan view of the landfill is shown on Figure 1-2. The landfill covers approximately five to six acres and is located at the head of a narrow valley on the site of an abandoned strip mine. Figure 2-3 presents a schematic cross-sectional view of the construction history where the original coal was stripped from the hillside and approximately 25 feet of waste deposited in its place.

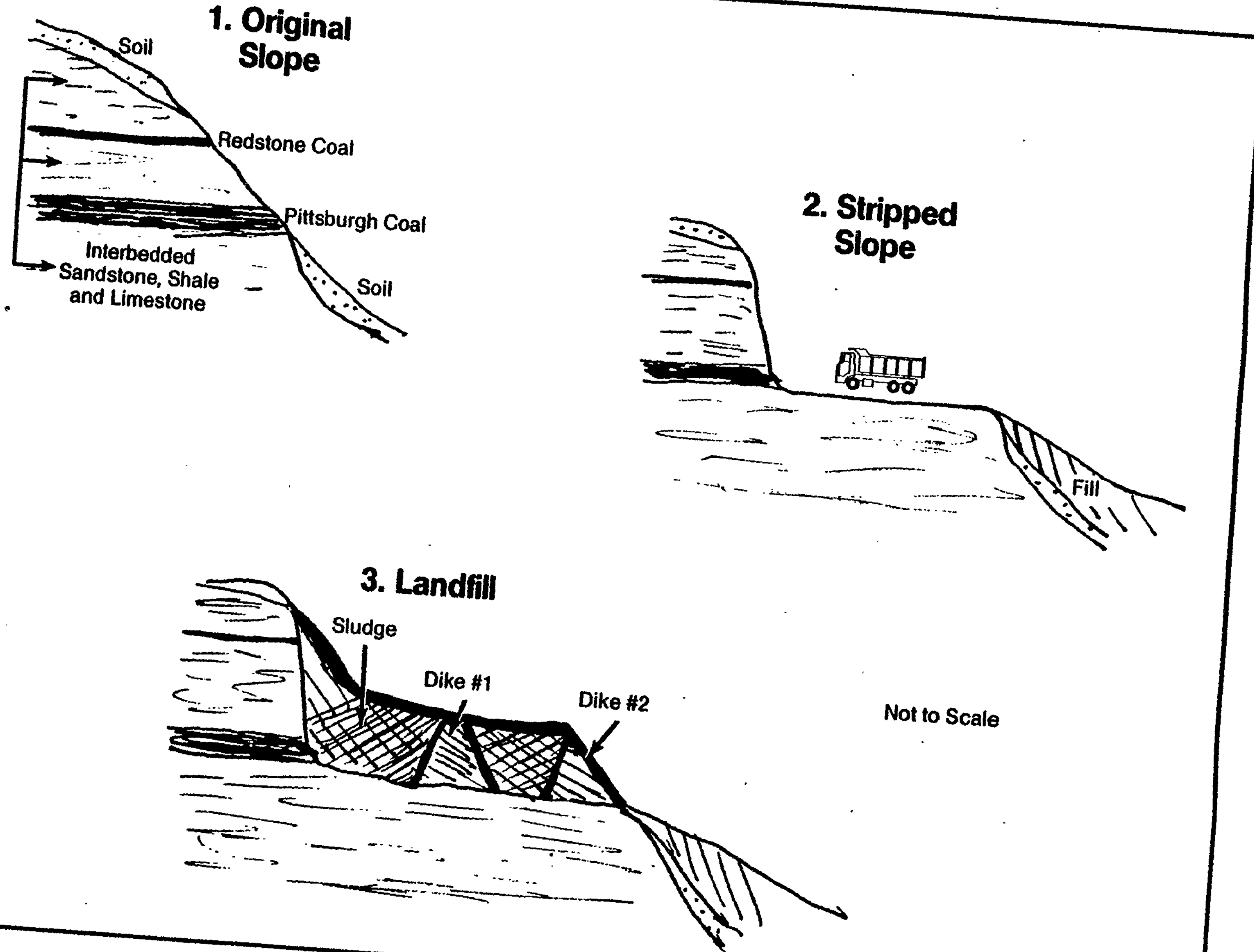

FIGURE 2-3 SCHEMATIC OF LANDFILL CONSTRUCTION

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During construction (1950 - 1964), the waste was placed as a wet sludge behind an earthen dike. When the first diked area was filled, a second dike was built further down slope and the area behind it filled.

WHO INSPECTED ? WHAT CRITERIA ... FOR STAB...

The present condition of the landfill toe dike appears to be stable, with the interception trench in place to relieve excess seepage pressure. The surface of the landfill is level with some depressions. The slopes surrounding the landfill on three sides are steep with some rock outcropping.

The more gently sloping area above the valley is residential with single family houses built during the last 30 years. Drainage from this area is routed along roadways to two catch basins which discharge into the valley with flow along the north edge of the landfill to a stream. The stream originates just north of the landfill toe in a seepage area, which is the source of base flow for the stream. Below the landfill toe the valley narrows to less than 100 feet to the end of the property (Figure 1-2) where it opens out to the broad Monongahela Valley. The stream crosses the valley and enters the river about one-half mile away.

An older residential area and a small mobile home park are located downslope of the site. The area toward the river is largely industrial.

POTW ?

A sanitary drain serving the hilltop community also runs along the northern edge of the site, and parallel to the stream. The residences are on public water and sewer lines although some drain fields may still be in use above the landfill. No residences in the area are known to use wells for household consumption.

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SECTION 3

SITE INVESTIGATION ACTIONS TO DATE

3.0 GENERAL

This section summarizes the field activity to date conducted by Hercules, Incorporated to investigate ground water and soil conditions at the landfill site. A series of investigations were conducted between 1980 and 1984 that provided information in the following areas:

- Bedrock ground water conditions in the shallow water bearing zone (Pittsburgh Coal).

- Soil conditions and the extent of contaminated soil downgradient of the landfill toe.

ENG'G CALC FOR SOIL EXIST ?

- Shallow ground water conditions in the soils downgradient of the landfill toe.

- Soil conditions and the top-of-bedrock profile at the landfill toe. This information was acquired prior to the design of the interception trench.

The following sub-sections describe the site investigation to date which was completed in several stages. These activities included the following:

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1980 Installation of four ground water monitoring wells (TW-1 through TW-4) and preparation of a PADER Module 8 (submitted October 6, 1980 and prepared by Murray Associates).

1981 Soils and ground water investigation downgradient of the landfill toe (WESTON Reports, August and December 1981).

1982 Installation of additional bedrock monitoring wells TW-5 and TW-6 (logs submitted to PADER by WESTON August, 1985.)

1983 Installation of interception system. Installation of well TW-8 to monitor bedrock downslope.

1984 Installation of Wells TW-9, TW-10 and TW-11 to monitor the interception trench. Installation of bedrock well TW-7.

3.1 SOILS AND SHALLOW GROUND WATER INVESTIGATION

During 1981, WESTON conducted a soils investigation in the valley, downslope of the landfill toe, to determine the extent of contamination. The investigation consisted of a series of 12 test pits and eleven soil borings. Temporary PVC ground-water monitoring points were installed in six of the test pits and a temporary oil recovery point was installed at one location (TP-5). TW-1, installed in 1980,

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is also screened in the water table. TW-9, TW-10 and TW-11 were installed in 1984 after the installation of the interception trench. The location of the test pits and monitor wells are shown on Figure 3-1 and a site detail showing soil boring locations is presented on Figure 3-2.

A detailed discussion of valley soil conditions is presented in WESTON's report of December, 1981. In general, soils encountered in the valley consist of organic silts and silty clays overlain by various fill soils. The bedrock surface was encountered between 10 and 29 feet below the surface and represents the original erosional surface of the valley or "hollow".

A perched ground water table occurs in the soils at depths varying from approximately 2 to 9 feet and is continuous with the stream elevation. The water table is perched on the underlying siltstone which contains little or no water as indicated by deeper borings made into bedrock (Section 3.2).

What is [illegible] by analysis?

Oily resin/solvent product was found in both soils and perched ground water. The extent of visible contamination in the valley is from the landfill toe to approximately the location of TW-1. Visibly contaminated soils were found in test pit 11 but not in test pit 12 (approximately 75 feet downslope of TW-1, see Figure 3-1). Floating product was observed in a number of borings and test pits. A particularly large flow was found in test pit 5. Consequently, a 6-inch slotted casing was installed there prior to backfilling and several hundred gallons of product were later recovered.

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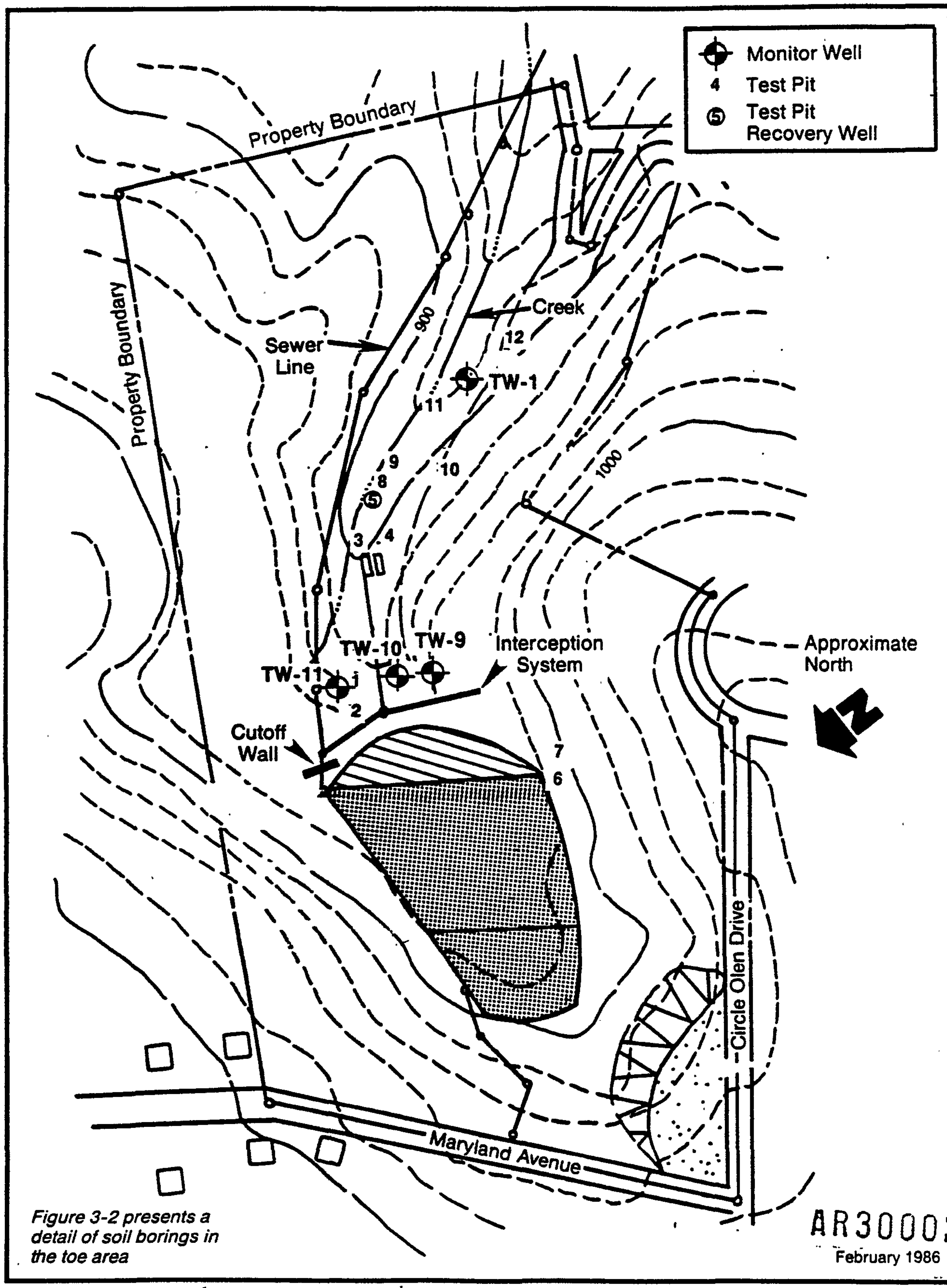

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FIGURE 3-1 LOCATION OF THE TEST PITS, AND WATER TABLE MONITORING POINTS IN THE VALLEY SEDIMENTS

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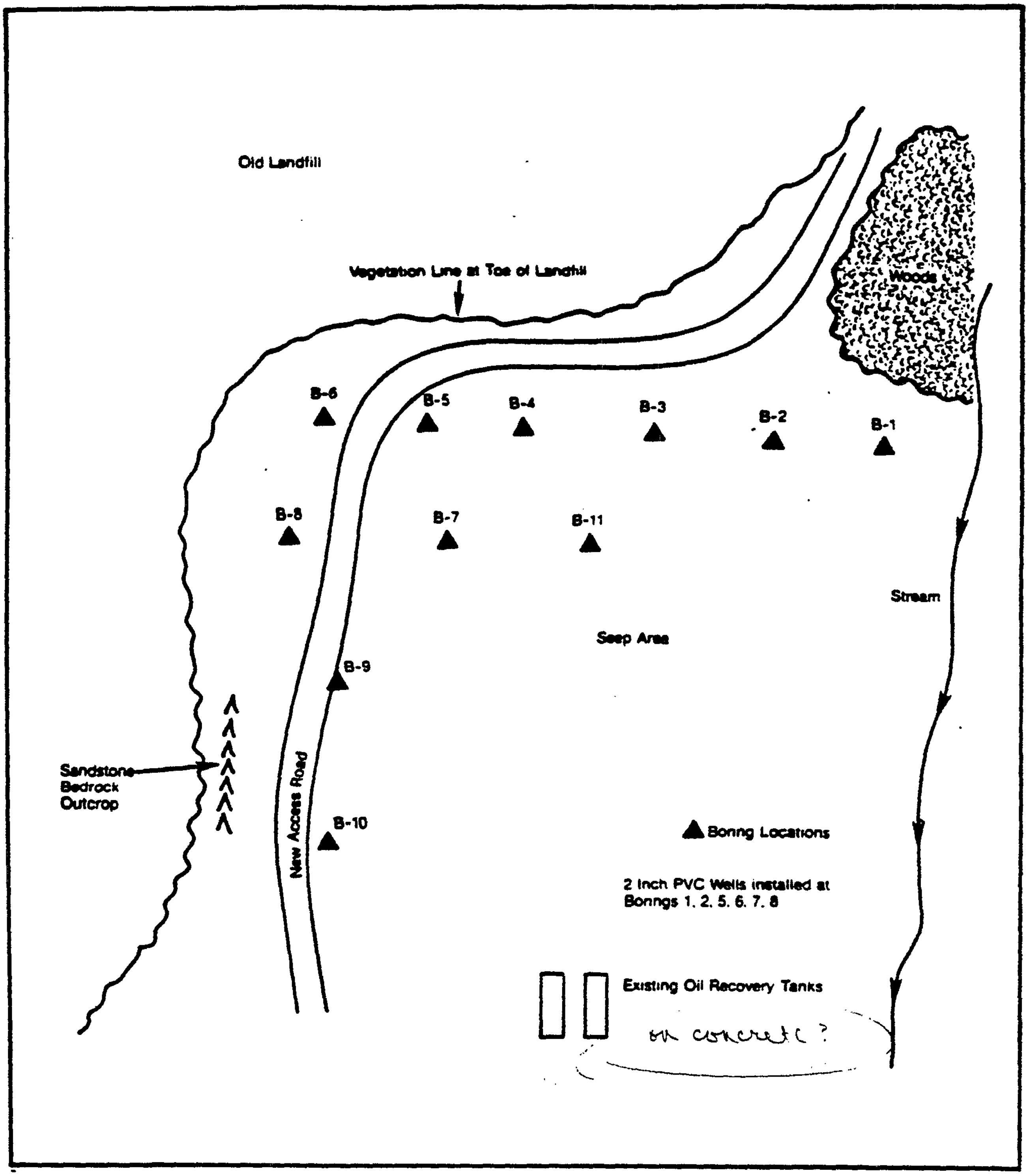

FIGURE 3-2 SCHEMATIC OF SOIL BORING LOCATIONS AT TOE PRIOR TO THE INTERCEPTOR TRENCH INSTALLATION

- N arrow
- Future maps should be oriented similarly

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3.2 BEDROCK MONITORING WELLS

Seven bedrock monitoring wells have been installed at the landfill site in two stages: TW-2, TW-3 and TW-4 were installed in 1980, and TW-5 through TW-8 were installed between 1982 and 1984. The locations of these wells are shown on Figure 3-3. TW-2, TW-3, TW-4 and TW-7 are cased and screened through the Pittsburgh Coal which is the principle water bearing zone in the bedrock. Ground water elevations in these wells are shown in Table 3-1. TW-5 and TW-6 were cased through the Pittsburgh Coal with open boreholes below the casing to depths of 200 and 300 feet respectively. Both wells were dry at completion although after several weeks, water slowly accumulated in both. TW-8 was located downslope of the landfill and was cased through overburden soils. TW-8 is 40 feet deep with an open borehole from 26 to 40 feet. This well was also dry at completion. TW-8 was placed to discover whether fractured bedrock along the valley axis provided a pathway for resin/solvent product flow. The results indicate that this is not the case at least to depths of more than several feet into bedrock. TW-8 became inaccessible during the construction activity associated with the interception system and was abandoned.

The boring logs associated with the well installation provide information on site lithology and ground water occurrence. Figures 3-4 and 3-5 are cross sections of the site based on well log information. Generally, they show that bedrock consists of interbedded limestones, shales and sandstones with two major coal seams: the Pittsburgh and the

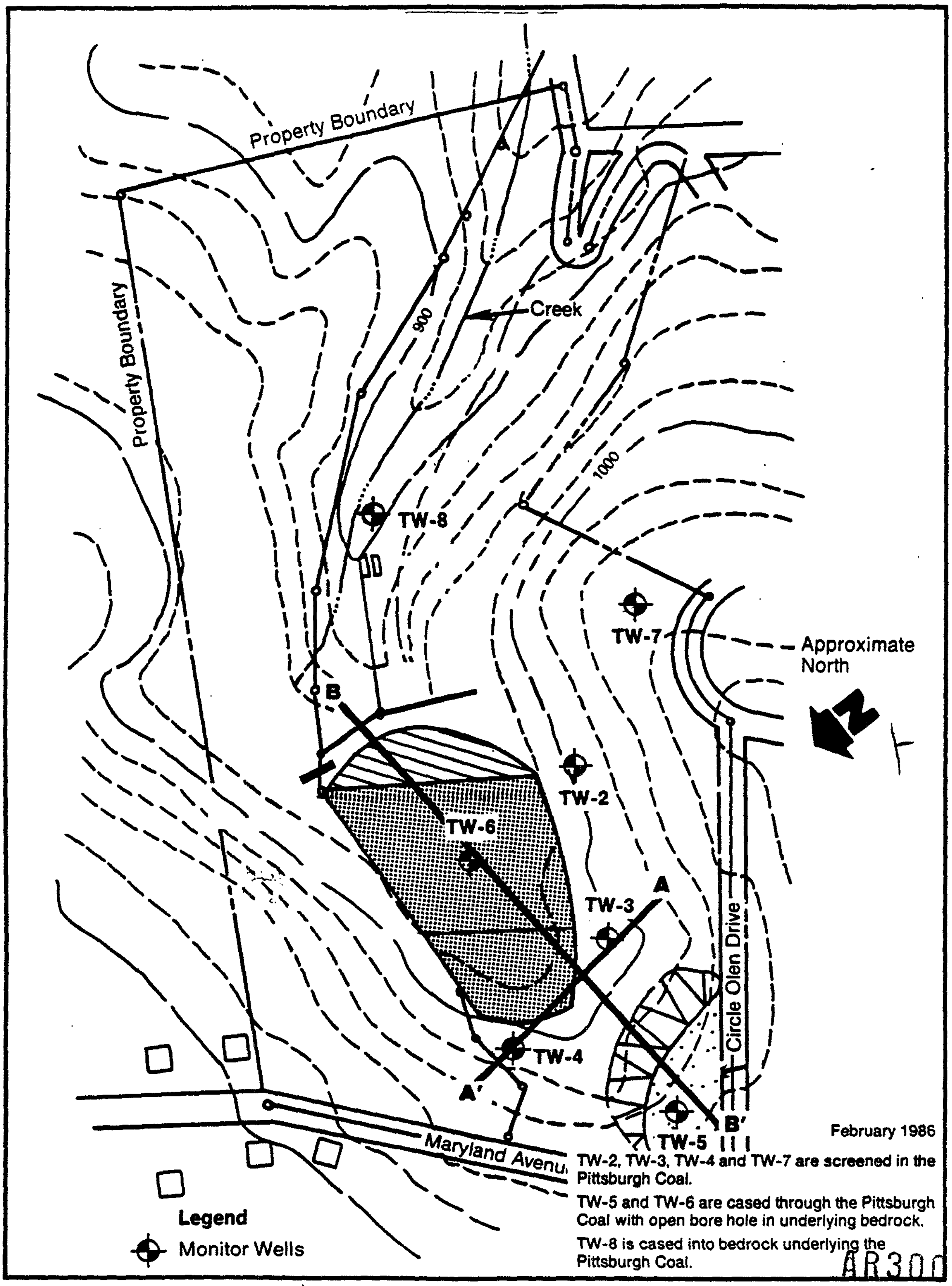

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FIGURE 3-3 LOCATION OF BEDROCK MONITOR WELLS

TABLE 3-1

GROUND WATER ELEVATIONS IN
THE PITTSBURGH COAL (12-3-85)

Well	Depth to Water (Feet)	Top of Casing Elevation (Feet)	Ground Water Elevation (Feet)
TW-2	34.1	988.21	954.1
TW-3	35.2	992.45	957.3
TW-4	35.5	993.44	957.9
TW-7	90.1	1,041.41	951.3

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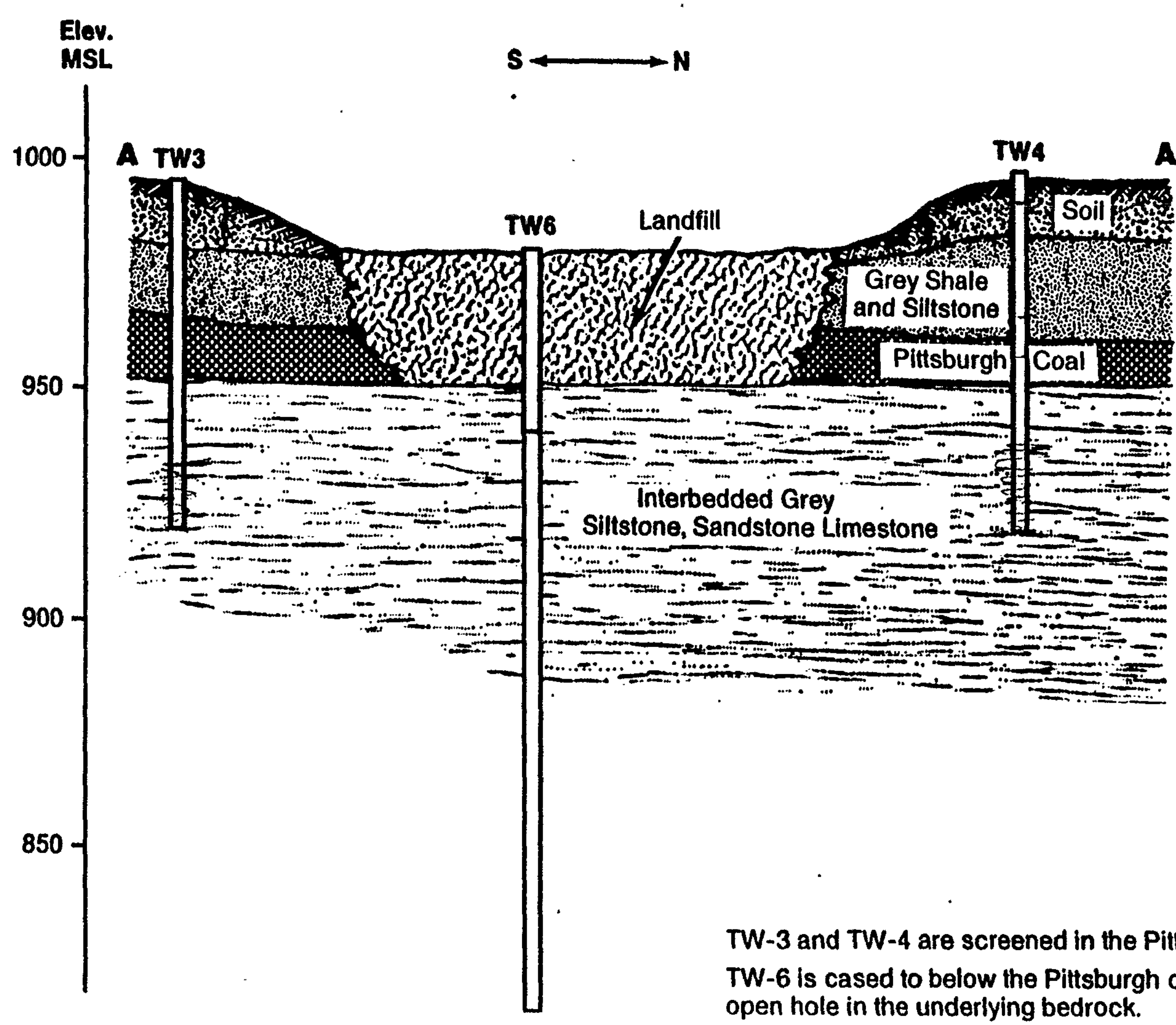

Correct Diagram

TW-3 and TW-4 are screened in the Pittsburgh coal.

TW-6 is cased to below the Pittsburgh coal with an open hole in the underlying bedrock.

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**FIGURE 3-4 HERCULES, JEFFERSON, PA
CROSS SECTION OF LANDFILL SITE (A-A')**

overlying Redstone Coals. The cross-sections show the relationship of the landfill to the Pittsburgh Coal. The base of the landfill is horizontally contiguous with the coal bed. The coal seams are relatively permeable and contain water, while the rock above and below the Pittsburgh Coal contained very little water and no water bearing fractures were observed during the drilling (frequent pauses were made during the progress of the air rotary drilling of TW-5 and TW-6 to check for water bearing zones). Water level mesurements in TW-2, TW-3 and TW-4 indicate that the Pittsburgh Coal is only partially saturated through its 5 to 8 foot thickness.

3.3 SUMMARY OF SITE CONDITIONS

Based on the subsurface investigations of the landfill to date the key elements of concern to a remedial investigation have been identified although within each element data gaps still exist. These are addressed in Section 4. The information at hand is summarized below.

3.3.1 Ground Water Flow

The principle bedrock water bearing zone on site is the Pittsburgh Coal. Ground water elevations calculated at wells TW-2, TW-3, TW-4 and TW-7 are presented in Table 3-1 and show that TW-7 is the most downgradient well, although the well configuration does not enable the construction of a unique ground water surface map. The downgradient position of TW-7 is consistent with the regional depth of the Pittsburgh Coal (Figure 2-2) which was the original basis for the

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location of that well. TW-4 is the most hydrologically up-gradient well, although its proximity to the landfill probably rules it out as a monitoring point for background water quality.

The landfill, because it is relatively flat and poorly drained and is located in a catchment area for surface runoff, provides a possible major local recharge zone for the Pittsburgh Coal. Percolation through the landfill discharges in part through the landfill toe, but a portion could follow the top of the coal bed which dips away from the toe and outcrop line.

No significant water bearing zone was observed in the bedrock below the Pittsburgh Coal. Although it is possible that water bearing fractures were missed by the borings for wells TW-5, TW-6 and TW-8, those three borings were made at the axis of the valley. This is the most obvious linear feature which could indicate a fracture zone in the bedrock.

The other water bearing zone at the site is the perched water table in the valley soils. As observed in test borings and pits, the soils are saturated several feet below the surface and the water bearing zone appears perched over the underlying bedrock. The mixture of fill and natural soils in the valley has a low to moderate permeability. The ground water flow direction is south east along the valley axis and parallel to the stream which is hydraulically continuous with the water table and is probably receiving recharge from the ground water during periods of low flow. Recharge to the ground water table comes from direct percolation through the soil, seepage from the landfill toe (now intercepted by the trench) and lateral seepage through

TABLE 3-2

GROUND-WATER QUALITY HIGHLIGHTS
JEFFERSON LANDFILL

	TW-1 7/7/81 (4/28/82)	TW-2 7/7/81 (4/28/82)	TW-3 7/9/81 (4/28/82)	TW-4 7/9/81 (4/28/82)
pH	6.9	6.3	7.4	7.3
Phenolics (mg/l)	0.04	0.45	1.3	0.02
<u>VOA (ug/l)</u>				
Benzene	124 (77)	109 (200)	446 (1700)	6 (38)
Toluene	8 (130)	535 (870)	846 (3600)	11 --
<u>B-N-E- (ug/l)</u>				
Naphthalene	(170)	(440)	(1900)	(29)

-- Not Detected

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upslope soils. As discussed in Section 3.1, separate phase resin/solvent product was observed in the perched water table. Its source was evidently from direct deposition of contaminated soils into the landfill and from landfill toe seepage previous to the installation of the interception trench.

3.3.2 Ground Water Quality

A complete analysis for EPA Priority Pollutant list compounds was performed on samples from wells TW-1, TW-2, TW-3 and TW-4. In these wells the water table is located in the Pittsuburgh Coal. These results are presented in Appendix B. Table 3-2 summarizes several organic compounds which were identified at elevated levels in the samples. They are phenolics, the volatile compounds benzene and toluene, and the base neutral compound naphthalene which were found in all of the wells sampled. These compounds were also found in the landfill leachate which was collected from the oil/water separator. These results are also presented in Appendix B. Only TW-2, which is screened in a void, contained separate-phase floating product. The results indicate the presence in the monitor wells of a limited number of dissolved constituents whose probable source is leachate from the landfill. TW-4, which is furthest upgradient, also shows the lowest concentrations of these key constituents. As discussed in the previous section, however, the proximity of TW-4 to the landfill raises some question as to whether the levels are truly background.

3.3.3 Extent of Migration

The site investigation data collected to date indicates that migration of contaminants beyond the buried waste material

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has occurred via two primary pathways: down dip in the Pittsburgh Coal water table and downslope of the landfill toe in the valley soils and perched water table. The types of migration are as follows:

- o Landfill toe seepage of contaminated water and resin/solvent product into the perched water below the landfill dike; this perched water is being collected by the interception trench.

- o Movement of contaminants from the waste material into the Pittsburgh Coal shallow water table, with possible migration down dip within the Pittsburgh Coal.

- o Direct movement of resin material, prior to the completion and stabilization of the disposal site, into the stream and onto soils below the landfill dike.

- o Solubilization of contaminants from any product or oil in soils downslope of the interception trench; contaminants could then move into the perched water table or stream.

Since the physical stabilization of the landfill and the construction of the interception trench at the toe of the landfill, the potential for failure of the landfill dike has been minimized and the toe seepage is being intercepted and collected. The landfill is physically stable; the foreslope

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has been regraded and the toe drain mitigates the build up of excess seepage pressure. The surface is vegetated and no major erosion is occurring.

From the results of the field investigation to date, it is evident that the extent of soil and ground water contamination in the valley by separate phase product is limited in extent to the area downslope of the landfill toe and upslope of TW-1. A separate product phase is also present on the water surface in TW-2 (screened in a void). The extent of migration of separate phase product in the Pittsburgh Coal appears limited to mined out areas adjacent to the landfill. Presently there is no indication of extensive deep mining adjacent to the site, although this has not been completely ruled out.

The presence of dissolved constituents in TW-1 through TW-4 indicate that these constituents have a potential for migrating more rapidly than the separate phase product.

3.3.4 Waste Characterization

The nature of the waste in the landfill is inferred from the production records of the plant (Figure 1-3) and no direct characterization has been made. Although the waste body itself is heterogenous, the oil leachate being collected by the interception system represents a relatively uniform composite of mobile constituents. An analysis of base neutral compounds in the leachate product indicated the presence of napthalene and lighter benzene compounds. (These results are presented in Appendix B of this report).

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SECTION 4

REMEDIAL ACTION TO DATE

(INTERCEPTION TRENCH CONSTRUCTION)

As a result of the field investigation of 1981, WESTON recommended to Hercules that an interception trench be installed at the landfill toe to collect seepage in the perched water table below the dike. This trench would be keyed to the shallow underlying bedrock so that a complete interception of seepage would be achieved.

In 1983, Hercules constructed this trench and an associated oil/water separator system. The location of the trench and separator system is shown on Figure 1-2. During construction it was also decided to extend the trench to intercept the drainage bedding of the sewer line running across the northern side of the site. The gravel bed below this line provides a potential conduit for flow from the landfill and the extension of the trench now intercepts that possible flow. Downslope of the interception trench, the land surface drops off abruptly and the sewer line runs along the side wall of the valley, upslope of the stream and contaminated soils area. Therefore, downslope of the landfill, neither the line nor its drain bed provide a pathway for contaminants.

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Figure 4-1 and 4-2 show cross-section design details of the interception trench and collection elements of the trench. Presently, oil is being collected and carried off-site and the water is being discharged to the Jefferson Borough sewer system under a discharge permit.

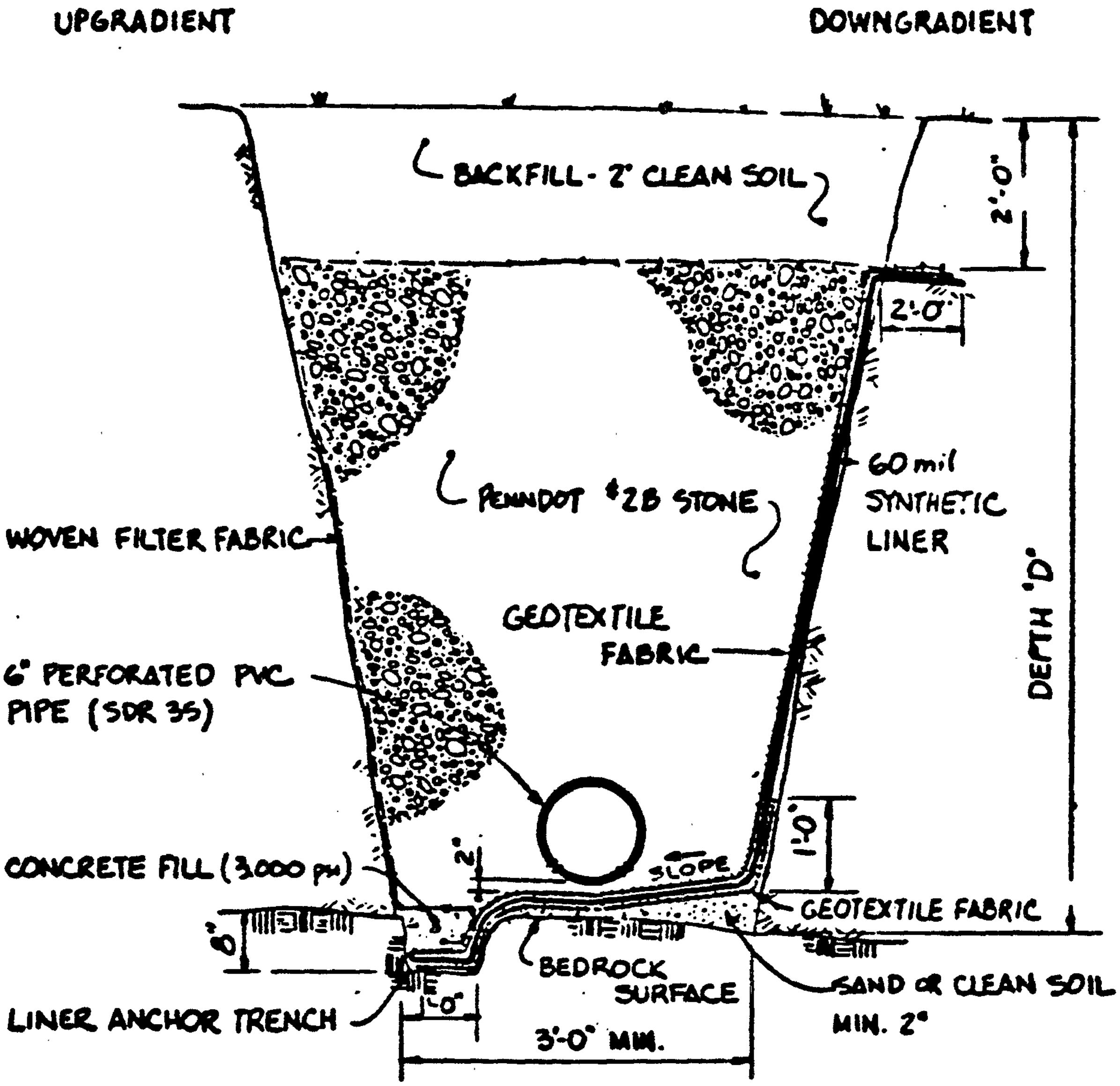

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FIGURE 4-1 CROSS SECTION OF INTERCEPTION TRENCH

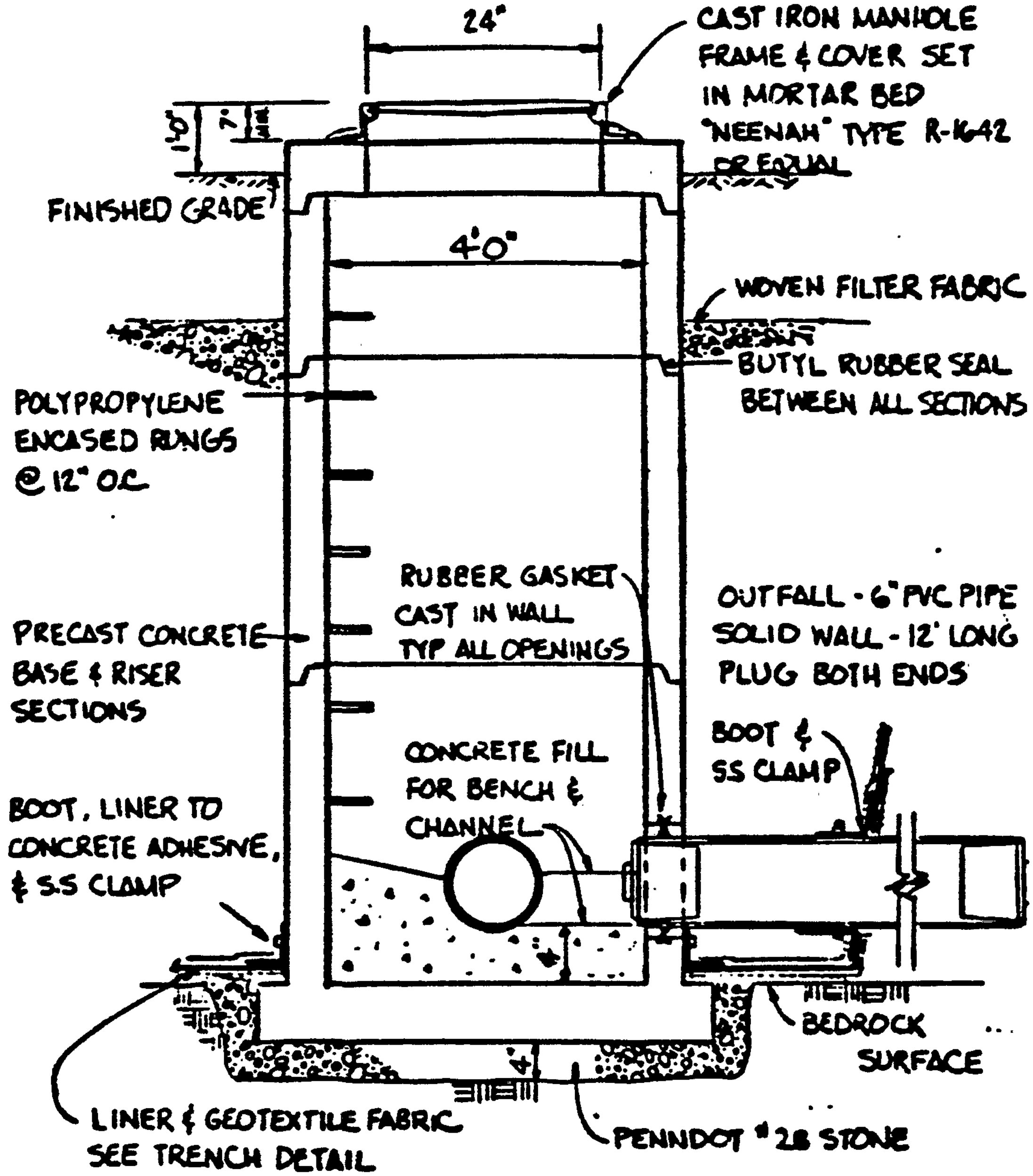

FIGURE 4-2 CROSS SECTION OF INTERCEPTOR TRENCH MANHOLE AND OUTFALL PIPE

SECTION 5

DATA REQUIREMENTS

5.0 GENERAL

In order to complete a feasibility study of remedial alternatives for the site, certain data gaps will need to be addressed in the areas of waste characterization, soil properties, site hydrology, air quality impact, extent of migration of contaminants and potential receptors. Also, the present effectiveness of the interception trench should be determined. These areas are discussed in the following paragraphs.

5.1 WASTE CHARACTERIZATION

As discussed in Section 1.0, the waste deposited at the site is not homogenous and its estimated volume and composition are based on production records and have not been verified in the field. A field verification of the estimated landfill depth and lateral extent is required. In addition, the following physical properties of the landfill should be determined:

- The volume of waste in the landfill, its strength and consolidation properties, along with the degree of stabilization achieved to date.

- The nature of cover soils including thickness, permeability, moisture content and compaction.

- Strength characteristics of the soils comprising the lower dike.

Some additional information on the chemical properties of the waste is also necessary. It is not necessary or practical to thoroughly characterize the heterogenous mass; however, analysis of selected samples from the landfill will provide field data regarding the range of variability of the waste and a check on the reported composition obtained from production records. The environmental impact of the waste is best understood by analyses of the leachate. This is in effect the "soup", or composite, of mobile constituents of the waste and is relatively homogeneous in character.

5.2 AIR QUALITY ASSESSMENT

In the past, odors have been reported that were thought to be coming from the landfill. These odors are suspected to be associated with surface seepage, rather than vapor penetration of the cover. The seepage conditions have since been corrected. However, no measurements have been taken within the site or along the property boundaries. Existing air quality and the possible effect of this issue on any remedial alternative should be addressed.

5.3 OFFSITE MIGRATION OF CONTAMINANTS

As discussed in Section 3.3.3, product phase (manifested as floating oil) and dissolved constituents of the waste resin

A complete water budget should also be developed for this landfill, including precipitation, runoff and ground water recharge. Understanding the interaction of site ground water and surface water is key to developing effective remedial alternatives.

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location of the new well(s), as well as stream and soil sampling points. These data will be added to the base map constructed from an aerial survey in 1982, prior to the construction of the interception trench. The area around the landfill toe will also be resurveyed to update the base map regarding the earth moving associated with the trench construction.

6.2 WASTE CHARACTERIZATION AND EVALUATION OF PHYSICAL CONDITION

A series of 25 soil auger borings is proposed for the landfill and downslope area to assess soil conditions. The proposed boring locations are shown on Figure 6-1. The purpose of the borings is to determine landfill boundaries, gather information on physical conditions within the landfill, collect samples for chemical and physical analyses and to determine the extent of contamination in soils down slope of the landfill.

Portable GC

Borings will be completed using hollow stem augers. The landfill borings will be completed to bedrock with split spoon samples taken at 2 foot intervals. Each sample will be screened in the field for volatile compounds using a photoionization device.

Only 5?

Five representative waste samples, collected from the split spoon samples, will be selected for chemical analysis; analytes will include petroleum hydrocarbons, volatile organics and base neutral compounds. Two additional samples

SECTION 6

PROPOSED REMEDIAL INVESTIGATION

6.0 GENERAL

Based on the data requirements identified in the previous section a comprehensive field investigation is proposed to collect data required to complete the feasibility study outlined in Section 7 of this work plan. The proposed investigation involves the identification of potential receptors, air quality monitoring and the collection of additional ground water, surface water and soils data at the site.

6.1 SITE RECONNAISSANCE AND RECORDS REVIEW

Prior to the start of the field investigation, a review of available information regarding site conditions will be done. This includes mine records, well records, and other records of possible receptors. Prior to the start of drilling at the site, a geologist will visit the site to stake out monitor well, soil boring and stream sampling locations on site, and to identify off-site sampling locations including local wells and hillside springs in the Pittsburgh Coal down dip of the site particularly in the area around Lobb's Run.

At the completion of the initial field program, a ground survey will be completed to establish the elevation and

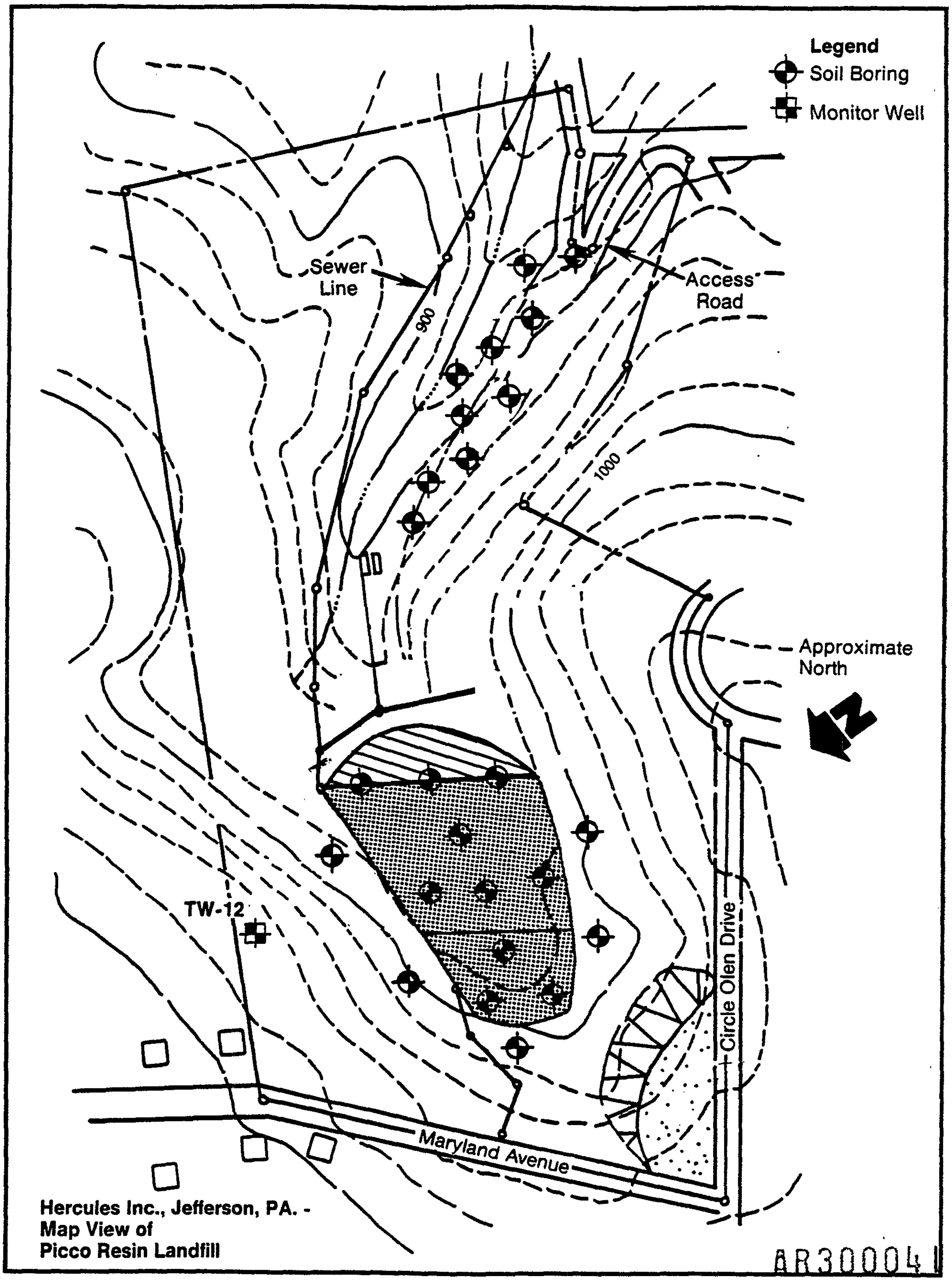

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FIGURE 6-1 LOCATION OF PROPOSED SOIL BORINGS AND UPGRADIENT MONITOR WELL

TABLE 6-1

SUMMARY OF SUBSURFACE SOIL ANALYSES

	Petroleum Hydrocarbons VOC, BNA	[1]Full HSL plus Petroleum Hydrocarbons
Landfill	5	2
Downslope		
0-2 feet	9	1
Approx. 5-7 feet (just above water table)	9	1
Approx. 8-10 feet (top of rock)	9	1
Total Analyses	32	5

[1]includes Hazardous Substance List VOC's, BNA's, Pesticides/PCB's and Metals.

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toluene, to the atmosphere. Naphthalene, also present in the leachate, is much less volatile.

Air quality at the site will be tested for levels of volatile organic compounds to assess possible site impact. The test will be accomplished by establishing a series of ten monitoring stations, eight around the landfill perimeter and two on the landfill. This will enable sampling of upwind and downwind directions, and the establishment of background air quality. Air sampling will be conducted during "worst case" conditions, that is during warm weather at a time when the air is still.

All air sampling will be done two meters above ground level to remove the effects of air-flow-disturbances caused by vegetation and man-made structures. The volatile organic compounds will be collected in tubes containing 1400 mg of Tenax. The collection rate will be 100 ml per minute. A five-hour monitoring period is planned to yield a total air sample of 30 liters. Samples will be analyzed for HSL volatile compounds, including benzene and toluene. Naphthalene, a semi-volatile, cannot be detected using this sampling technique. Sampling and analyses for semi-volatiles may be required if significant levels of volatile compounds are detected.

6.4 GROUND AND SURFACE WATER INVESTIGATION

6.4.1 Monitoring Well Construction

In order to complete the evaluation of ground water flow in the Pittsburgh Coal, an additional monitor well will be installed upgradient of the landfill as shown in Figure 6-1. Access to the drill site will be required from Maryland Avenue. The location needs to be carefully checked out prior to mobilization.

The additional well, to be labelled TW-12, will be installed by air rotary methods with a minimum 8-inch diameter minimum surface casing into bedrock. The borehole will be completed to the base of the Pittsburgh Coal, and 4-inch stainless steel screen inserted into the borehole. The screen will be 10 feet long and will intercept the entire Pittsburgh Coal which is about five feet thick and only partially saturated. The screen will be attached to a steel riser which will be fitted at the surface with a locking security cap. Figure 6-2 shows the construction details of the proposed monitor well. If practical, a sandpack will be set around the screen. If a mine void is encountered, a packer will be set in the annular space above the screen. A cement/bentonite grout will then be tremied into the annular space.

TW-1 has been reportedly damaged. If this well is not found to be in service, it will be replaced with a well similar in construction to TW-12. The replacement well will be screened in the soil overburden, with 10 feet of screen extending approximately one foot above the water table, which is approximately 5 feet below the ground surface.

6.4.2 Borehole Geophysical Logging

Log entire length

In order to further characterize the bedrock underlying the Pittsburgh Coal, TW-5 and TW-6 will be logged with natural gamma, resistivity and caliper tools.

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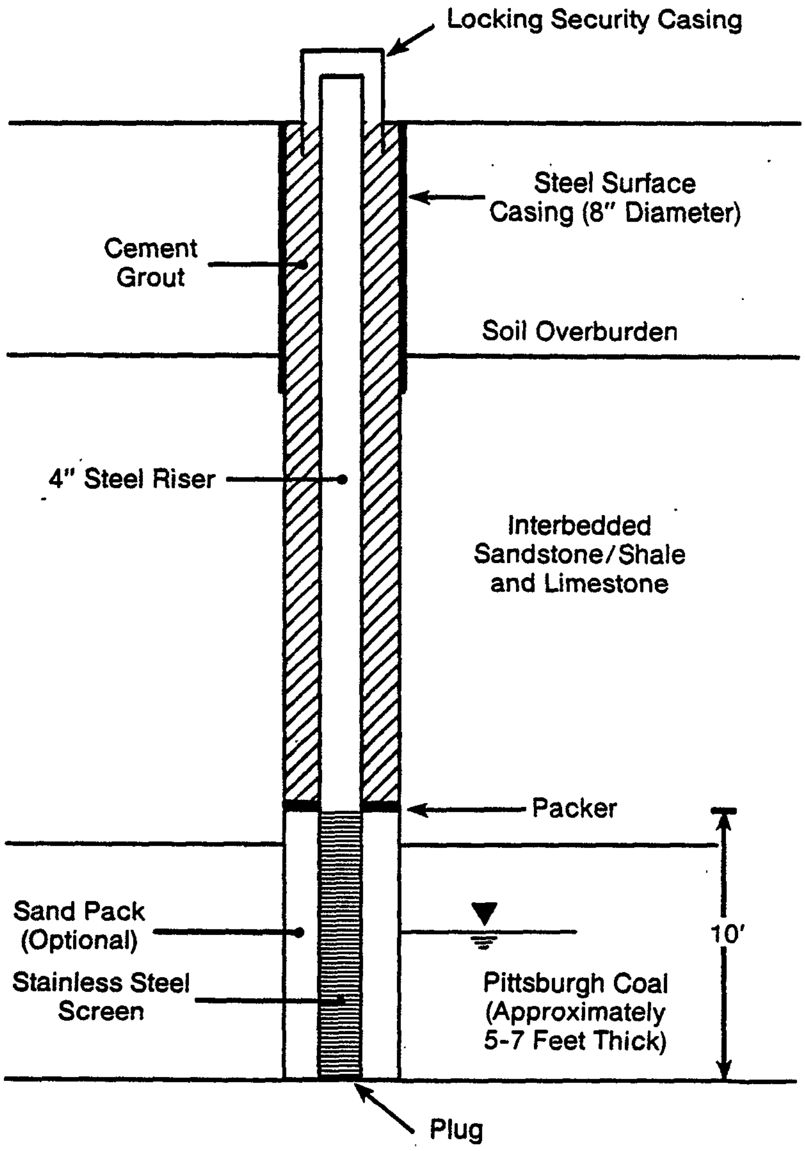

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FIGURE 6-2 PROPOSED MONITORING WELL CONSTRUCTION

6.4.3 Ground and Surface Water Sampling

A single complete round of ground and surface water samples will be collected to characterize site water quality and to evaluate the migration of key compounds. Samples will be analyzed for EPA HSL Compounds. These include benzene, toluene, and naphthalene which were identified in previous samples of site ground water and leachate.

The total ground and surface water sampling program is outlined in Table 6-2. This includes TW-12 and the five existing wells in the Pittsburgh Coal, lower bedrock wells TW-5 and TW-6, and water table wells TW-1, TW-9, TW-10 and TW-11 below the landfill toe. Also included are additional residential wells and springs that may be identified in the initial site survey. The protocol for sampling TW-5 and TW-6 may require special attention because of their extremely slow recovery rate. Recovery measurements will be made on all wells after purging. Three sample rounds will be completed. The first round will be analyzed for full HSL compounds. The remainder will be analyzed for key compounds based on the initial results. All new wells will be initially sampled for the full HSL compounds.

Surface water samples will be collected at eight locations in the valley stream. A sample will be taken at the origin in the seepage area north of the landfill toe. A second sample will be taken just downstream of TP-5, to evaluate the effect of valley soil and ground water contamination on the stream. The third sample will be taken at the down-stream property boundary.

TABLE 6-2

SUMMARY OF SAMPLE LOCATIONS
GROUND WATER, SURFACE WATER AND SEDIMENTS

Pittsburgh Coal	TW-2, TW-3, TW-4, TW-7, TW-12
Deep Bedrock[1]	TW-5 and TW-6
Water Table Below Landfill Toe	TW-1, TW-9, TW-10, TW-11
Residential Wells[2] and Seeps	To be identified during initial survey.
Stream	3 Locations on property: At origin, adjacent to the separator, and at the property boundary. 5 Locations off-property between the property boundary and old Rt. 837

1 Special protocol may be required for sampling because of extremely, low recovery time.

2 At least one residential well is known to be downslope of the site. Owner has not allowed access in the past. Assistance from PA DER is required in making residential contacts.

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Five samples will be taken between the property boundary and Old Route 837. Samples will be taken at low flow conditions at least three days after any significant rainfall, and again during a wet period when flow is high. Sediment samples will be taken at these locations during the "low flow" sampling. Surface water and sediment samples will be analyzed for HSL compounds. If the initial sampling and analysis of sediment and surface water from the eight proposed locations in the valley stream indicate the presence of chemical constituents related to the landfill in the water or sediment up to Old Route 837, then sampling of the stream to the point of its confluence with the Monongahela River will be undertaken.

6.4.4 Additional Downgradient Monitor Wells

After the water quality results have been reviewed and the exact flow gradient established it is anticipated that additional monitor wells may be required in the Pittsburgh Coal. The number and optimal location of any additional wells can be established after the initial groundwater sampling and survey is completed. The results of the borehole logs and recovery test well also be used to determine if any additional lower bedrock monitoring wells are necessary. WESTON will submit a technical memo with recommendations addressing this issue after the completion of the initial analysis.

6.5 PROJECT OPERATIONS PLAN

Prior to the initiation of the remedial investigation, a detailed Project Operations Plan (P.O.P.) will be submitted to the PADER for approval. This plan will establish the protocol for all sampling and data collection to be followed during the investigation. The key elements of the P.O.P. will include:

- o Specifications for well installation and soil borings

- o Sampling methods and QA/QC for the collection of ground water, surface water, soil and air samples

- o Laboratory methods and QA/QC procedures

- o Site Safety Plan

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SECTION 7

FEASIBILITY STUDY OF REMEDIAL ALTERNATIVES

7.0 GENERAL

A feasibility study (FS) will be performed to develop, screen and evaluate remedial actions for the Hercules/Picco Resin disposal site. Alternatives will be evaluated in terms of costs, effectiveness, and technical feasibility. The remedial controls which have been previously implemented at the site will be included as a major component in the feasibility study analysis. Potential remedial actions will consider possible migration pathways via ground water, surface water, soils and air along with health or environmental risks attributable to on-site contaminants and to contaminant migration. Some of these migration pathways have been addressed by the controls now in place at the site. The overall objective of the feasibility study program is the control of actual and potential sources of ground-water and surface water contamination in the soils and bedrock surrounding and underlying the landfill. The successful implementation of a remedial action program will meet this objective, and thereby mitigate the potential threat to public health and the environment that may be posed by the existing site conditions.

This section presents the procedures which will be followed in the preparation of the feasibility study evaluations for the Hercules/Picco disposal site. The overall approach to the feasibility study is shown in Figure 7-1.

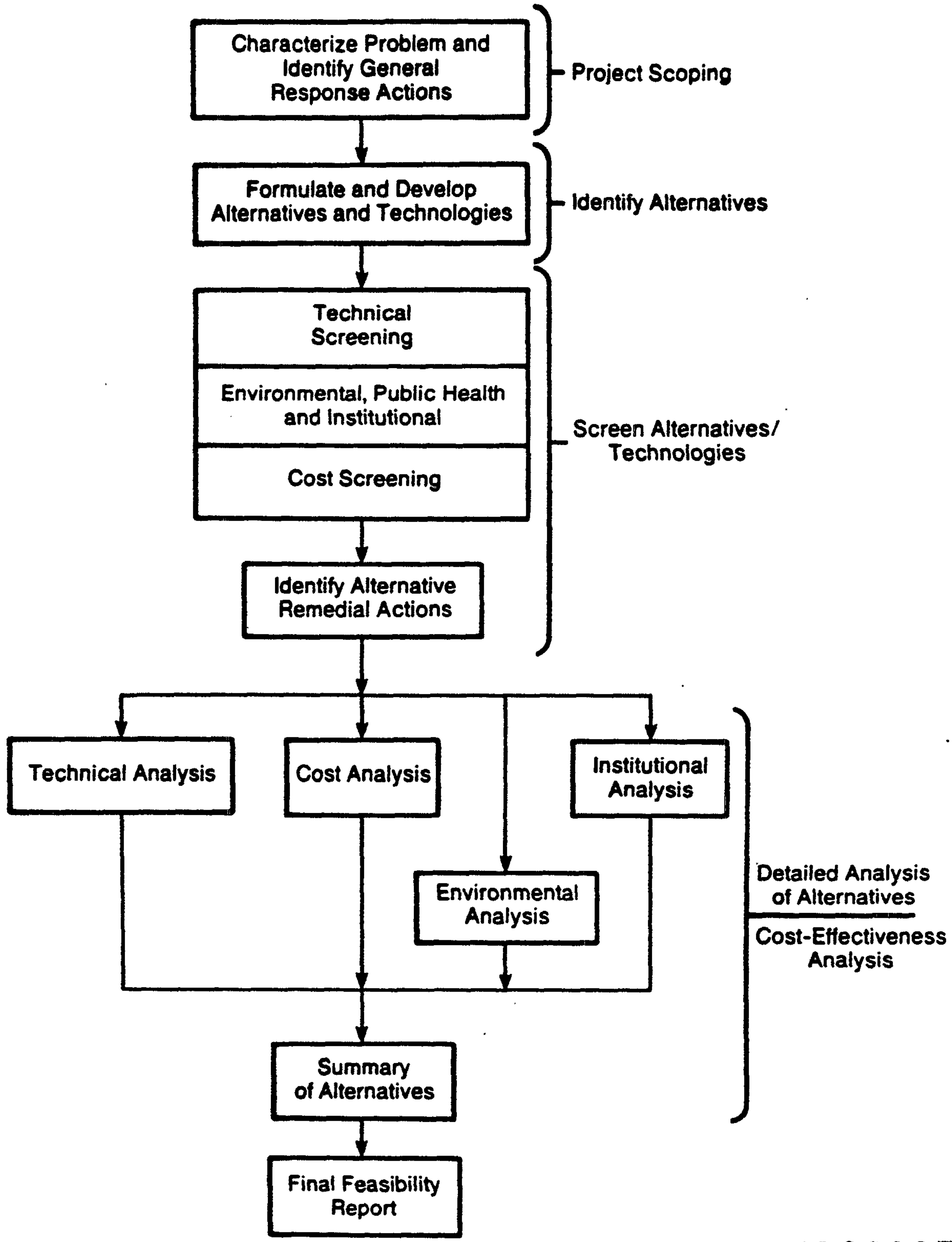

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FIGURE 7-1 FEASIBILITY STUDY PROCESS

7.1 SCREENING ALTERNATIVE REMEDIAL TECHNOLOGIES

7.1.1 Identifying Site Problems

The major environmental concern associated with the Hercules/Picco disposal site includes the possible leaching of chemicals present at the disposal site into the shallow ground water. Secondary concerns include soils, air and surface water pathways. The results of the endangerment assessment (see Section 7.1.4) will be important input to scoping size problems. The remedial alternative technologies will be screened for potential control of the relevant pathways. Presently, the primary potential migration pathway appears to be shallow ground water in the Pittsburgh Coal and the valley sediments. Generally, surface drainage is to the east towards the mouth of the side valley occupied by the disposal site. The valley is drained by a small stream which is the tributary to the Monongahela River. No definite deep ground water regime has been identified at the site within the underlying bedrock or Pittsburgh Coal seam. However, precipitation and surface water infiltrating and percolating through the landfill results in recharge to the Pittsburgh Coal. The fill materials and shallow subsoil present below the toe of the landfill collect and convey shallow ground water and thus act as a shallow water table. Presently, there is only one known user (residential) of ground water possibly affected by the site.

7.1.2 Identifying General Response Actions

The initial step in the feasibility study will be the identification of potentially applicable remedial response actions. Based on the current site information, the following response types will be considered individually and in combination with each other:

- No action
- Ground water recovery
- Containment
- Surface water collection and diversion
- Complete removal
- Partial removal
- Onsite treatment
- Offsite treatment
- Onsite disposal
- Offsite disposal

7.1.3 Technology Screening

A preliminary screening of technologies based on the Hercules/Picco disposal site conditions identifies potentially viable technologies for the general response actions shown in Table 7-1. This type of screening was conducted informally in the past as part of the selection process for control measures now in place at the site. Technologies that may prove extremely difficult to implement, may not achieve the remedial objective in a reasonable time, or may rely on unproven or very costly AR300053

TABLE 7-1

PRELIMINARY SCREENING TECHNOLOGIES

General Response Action	Potentially Viable Technologies
No action	Environmental monitoring and site security
Ground Water Recovery	Interceptor drains; pumping wells
Containment	Capping; ground water containment via slurry walls and injection grouting
Diversion	Grading; perimeter berm and channel construction
Complete Removal	Contaminated soils; waste materials
Partial Removal	Contaminated soils; waste materials
On-site Treatment	Incineration; biological, chemical, and physical treatment; air stripping
Off-site Treatment	Incineration; biological, chemical, and physical treatment; POTW
On-site Disposal	Contaminated soils and waste consolidation
Off-site Disposal(1)	Landfills; land treatment
Off-site Disposal(1)	Landfills; land treatment

(1) Pretreatment may be required prior to land disposal.

technology will be modified or eliminated. The final screening of technologies will utilize engineering judgement and the results of the RI to list the most viable technologies. To meet the requirements of the Superfund Amendments and Reauthorization Act of 1986 (SARA) treatment technologies will be considered and at least one will be evaluated throughout the feasibility study. Permanent solutions and alternate technologies will be assessed and used to the maximum extent practicable. Factors which will comprise the technology screening are discussed in the following paragraphs.

Environmental and Public Health

Areas of potential adverse environmental and public health impacts which may preclude the successful implementation of a potential alternative will be identified. Alternatives which may pose significant potential adverse impacts or do not adequately protect the environment and public health will be eliminated from further consideration. As part of the screening, the relative environmental and public benefits of a particular alternative will also be assessed.

Technical

Technologies or options which are not feasible or will not achieve the remedial objective will be screened out. Unproven technologies will typically be screened out, however, innovative or alternate technologies which may not be proven will be retained to meet the requirements of SARA.

Cost

A cost screening (order-of-magnitude) will be undertaken for those alternative remedial technologies which remain.

Screening will consider: construction/implementation/ maintenance and operating costs. On-site or off-site treatment technologies will be screened.

The objective of the cost screening is to screen out those alternatives whose costs are an order of magnitude or more greater than other alternatives yet do not provide substantially greater environmental or public health benefits. However, to meet the requirements of SARA some higher cost technologies may be retained for innovative/alternate technologies.

7.1.4 Endangerment Assessment (EA)

The potential health and environmental concerns posed by the site will be studied as part of an endangerment assessment. This work will evaluate the types of contaminants found on-site, pathways by which these contaminants could migrate, and receptors that could be impacted. The existing interceptor trench provides a primary barrier to the potential movement of contaminants from the landfill. Existing data do not indicate migration of contaminants off-site or the presence of a significant ground water pathway. However, additional site characterization work will be conducted as part of the RI field investigation.

Due to the fact that a significant amount of additional site data will be collected, the scope of the EA will be finalized during the RI so it can be better focused on site characteristics. The EA will be performed early in the feasibility study so that potential health/environmental concerns and primary pathways can be defined and the feasibility study alternatives developed accordingly. The alternatives can then be evaluated for effectiveness in recovering the identified risks. The EA will also serve as important input to the determination of cleanup levels if relevant.

It is expected that a scope of work for the EA will be finalized and presented by Hercules for discussion with PA DER and EPA to obtain concurrence prior to proceeding.

7.2 PRELIMINARY TECHNOLOGIES

7.2.1 General

This represents an initial overview of several response actions and technologies which have been implemented at the site or show a strong potential for possible application at the site. Several technologies are briefly described in the following sub-sections, along with the applicability of each technology to the site-specific conditions. Other technologies will be identified by means of the screening process as additional site information becomes available and to meet the alternate technology requirements of SARA.

7.2.2 Ground Water

7.2.2.1 Recovery

At present, contaminated shallow ground water is being removed from the landfill site by a interception trench and collection system and physically treated on-site by two oil separation units. This system serves to intercept seepage which flows through the landfill waste media and into the downslope unconsolidated material. The passive recovery and treatment system constitutes a remedial measure designed and implemented to mitigate possible contaminant migration. A sudden, permanent shutdown of the system would subsequently constitute a "no action" scenario. This situation could lead to the eventual migration of contaminants off-site within the shallow water table and possibly into the small expected that a possible alternative could involve either an extension of the trench or installation of a series of shallow "skimmer" wells to collect floating contaminants. Additional passive removal techniques (e.g. trench drains, sumps, etc.) would also be considered.

7.2.2.2 Treatment

All contaminated ground water collected in the sump of the interception drain is drained directly to the oil separation tanks. The treated ground water is discharged from the oil separation tanks into the Jefferson Township municipal sewer system, to the West Elizabeth Sanitary Authority (WESA) waste treatment plant (POTW) via an approved sewer discharge. Discharge of treated ground water into the POTW is approximately two to five gallons per minute. The adequacy of this separation and discharge system for handling the collected ground water and meeting regulatory requirements will be evaluated as part of the feasibility study.

Installation of additional recovery mechanisms to collect contaminated ground water may require modification of the existing separation system to handle the increased hydraulic loading or additional contaminants. Should this not be feasible, off-site treatment involving transport of recovered ground water to an off-site permitted treatment facility will be considered. Such off-site treatment could only be applicable for small volumes of highly concentrated ground water/oil product recovered using skimmer wells.

stream which drains to the Monongahela River. For the "no action" alternative, an environmental assessment will be performed to describe source/pathway/receptor relationships and thus determine specific possible impacts on receptors. However, because of the cost effectiveness of the interception drain and collection system in reducing otherwise possible downstream contaminant migration within the stream and shallow soil and bedrock deposits, the "no action" concept is not considered attractive at this stage of the program.

The direct removal of contaminants from the shallow water table will likely be an important part of any remediation plan until the quantity of seepage is greatly reduced or collected in other ways. Briefly, the interception trench system is comprised of two aggregate-filled trenches which gravity drain to a central sump, from which collected seepage is pumped. The trenches are installed to an approximate depth of 14 feet below grade and are keyed into the bedrock. The downgradient side slope of each trench is lined with an anchored Herclor synthetic membrane. The north end of the north trench is tied to a Herclor-lined concrete cutoff wall (see Figure 1-2). This cutoff wall prevents seepage from contacting an existing sanitary sewer line which traverses the northeast perimeter of the landfill. Collection of seepage from the interception trench system will serve two functions within the final remediation plan: the first is to intercept leachate migrating towards the site boundaries and the second is to relieve seepage pressure at the landfill toe.

In shallow, perched ground-water areas of relatively high concentration found in soils downslope of the landfill beyond the influence of the interception trench, it is

7.2.2.3 Subsurface Containment

The need for control of lateral migration of contaminated shallow ground water or seepage which could bypass the existing interception trench will be evaluated during the feasibility study. The primary migration pathway of concern is the Pittsburgh Coal seam, which dips away from the landfill toe. Additional monitoring well installation involved with the proposed remedial investigation will allow for more accurate determination of the shallow ground water zone, the lateral flow components within this zone and the potential for significant lateral migration off-site.

Containment of shallow, potentially contaminated ground water within the immediate landfill area will be evaluated. Two possible approaches:

- o Downgradient ground water interception trench as discussed previously, and
- o Subsurface perimeter barrier to contain or restrict lateral flow.

Perimeter containment of the landfill could involve the use of slurry trenching. The feasibility of slurry trenching is generally dependent upon the type of materials required for excavation, site accessibility and the characteristics of the chemical constituents within the contaminated ground water to be retained within the landfill. Sealing the face or filling any mine voids of the Pittsburgh Coal seam to prevent direct entry of contaminated ground water into the seam could be accomplished by injection grouting techniques. The feasibility of this technology is dependent upon accurate determination of the depth and attitude of the Pittsburgh Coal seam, extent and interconnection of mine voids within the seam and gross structural integrity of the overlying and underlying bedrock formations within the immediate site vicinity.

The location and effectiveness of subsurface containment must be evaluated in conjunction with surface containment measures. For instance, the effective use of infiltration controls could significantly reduce recharge to the shallow water zone, thereby reducing the gradient for lateral migration.

7.2.2.4 Laboratory Testing

Laboratory or bench scale tests may be recommended to more fully evaluate the effectiveness of specific treatment and containment technologies. Such testing may include waste characterization analyses, biodegradation studies or compatibility assessment. If testing is recommended, laboratory test plans will be prepared to include test protocol, apparatus and analytical requirements. Literature information and data from other similar applications will be used when applicable and any lab testing may be deferred to the preliminary design stage if sufficient information is available for the feasibility study.

7.2.3 Surface Controls

7.2.3.1 Management and Infiltration Controls

Surface water management and infiltration controls will be very applicable to the landfill site. Typical management features could be designed to divert surface water "run on" entering the site and enhance surface water "runoff" that would otherwise infiltrate the site. By diverting run-on and increasing runoff, less water will be subject to percolation through the buried waste. This infiltration is responsible for most of the generated leachate which emerges at the landfill toe or moves down dip in the Pittsburgh Coal seam. In addition, minimizing infiltration should result in a reduction in a lateral gradient or potential head within the shallow water table.

Surface management controls include berms, ditches and channels, site grading and revegetation. The applicability and feasibility of select surface management controls will be assessed for the landfill site.

Infiltration control measures are specifically designed to reduce the percolation of surface runoff and precipitation into the underlying landfill wastes, thus resulting in a reduced potential for contamination of ground water. Such controls are appropriate due to the natural site conditions and topography. Reduction of infiltration can be achieved by "capping" the surface of the landfill with an impermeable or low permeability material. Surface water management and infiltration controls are included as an integral part of any cap system.

The range of potential type and complexity of a cap system that could be applicable to the landfill site is broad. A simple cap system would involve placement of a single layer or zone of relatively impermeable soil across the surface of the landfill. Multi-layer cap systems could also be feasible at the site and would involve installation of two or more zones or components within the cap section which could be natural or synthetic in nature and designed to

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prevent vertical infiltration, provide for lateral drainage and removal of water which has infiltrated the cap surface or serve as filter or bedding elements between adjacent zones of material. The landfill surface is presently covered with a soil material. This zone of material will be evaluated in the feasibility study for applicability to and adequacy within a particular cap system. The feasibility of a cap system will be generally related to the performance requirements of such a system, the characteristics of the in-place wastes with respect to ability to support the cap and the quantity of infiltration to be controlled. A cap system would consider RCRA criteria which are appropriate or relevant.

7.2.3.2 Surface Water

The on-site stream will be sampled as part of the field investigation work. Based on these results, possible remedial technologies may be considered for treatment/mitigation of on-site surface water contamination attributable to the landfill. Visual inspection of the stream and stream channel indicates the potential for contamination from sources other than the landfill. These possible sources include:

- Mine Drainage

- Discharge from off-site residential septic fields up hill from the site.

- Discharge from off-site miscellaneous residential sources such as laundry, auto repair, roof/road drainage uphill from the site.

- Leakage from sewer line which transects the site

The sampling program for surface water will determine the effect of these possible background sources on water quality. Any remedial treatment technology will not consider treatment of these background sources.

7.2.3.3 Laboratory Testing

Depending on the feasibility of the above technologies, a variety of lab tests may be recommended to evaluate the suitability and effectiveness of in-situ waste and soil materials as well as those materials involved with proposed surface water management and infiltration controls. The performance of the existing soil dike and proposed cap systems is very important to an overall site remediation plan.

Classification testing should be performed during the remedial investigation to assess the general suitability of possible borrow materials which could be used for construction of berms and soil cover/cap systems. Depending on applicability, performance testing of borrow materials could include consolidation tests for estimation of settlement characteristics, unconfined and triaxial compression tests for evaluation of shear strength and permeability tests to determine the ability of a select soil to control infiltration when used in a cap system.

Evaluation of the in-situ waste materials and dikes which are presently retaining these materials should also be performed. Tests will be performed on representative samples of the dike materials to permit analysis of the stability of the dikes under present and proposed loading conditions. Borings will be completed during the remedial investigation to determine the depths and profiles and to collect samples of the waste and soils contained within the immediate landfill area and the contaminated soils present in the valley below the toe of the landfill. Verifying the structural integrity of the existing dike is important for evaluation of in-situ containment alternatives. The structural integrity of the dike must be confirmed to demonstrate long-term performance of any in- situ containment controls.

7.2.4 Soils

7.2.4.1 Remedial Objective

The feasibility study will develop and evaluate alternatives for soil remediation. Localized areas of soils below the toe of the landfill dike may represent a potential source for release of contaminants to the surface water and shallow ground water regimes and may require a response action. Some of these soils may have been contaminated with resin or past seepage from the landfill. In order to meet the objective of any response action, soil cleanup levels will need to be established for concerned areas of the site and these will be determined as part of a remedial feasibility study.

7.2.4.2 No Action

The results of the additional field work may indicate that all of the contaminated soil has been removed or that only trace quantities remain below the dike. In this case, no action may be appropriate. If some material still remains in localized areas it will have to be determined whether it poses an environmental risk and should be included in the remedial evaluations.

7.2.4.3 Excavation

Excavation and removal of contaminated soils below the area of the landfill dike for off-site disposal or on-site treatment or disposal within the landfill is a potential remedial alternative. This alternative has been "proven" at other landfill sites, although there are possible disadvantages to excavation. The first is that the area of interest includes the interception drain system which currently collects leachate from the disposal area. It would be difficult to excavate material in this area without possibly damaging the drain and its operation with the sump and oil separation facility. Secondly, excavation of significant quantities of contaminated soil along the toe of the landfill could result in potential instability and movement of the in-place wastes. Such movement could likewise damage the interception drain system and serve to increase the potential for off-site contaminant migration. A final consideration regarding excavation and land disposal of material is that the land disposal prohibitions (per HSWA) must be addressed with respect to characteristics of the material and possible pretreatment requirements prior to disposal.

Once excavated, contaminated soils must be disposed of properly or detoxified. On-site consolidation of wastes and contaminated soil materials within the landfill is a viable alternative. The primary difficulty here could be access to a suitable disposal location within the landfill. On-site treatment via high-temperature incineration using a transportable or mobile incinerator could be an effective method to treat contaminated soils by thermally destroying organic compounds contained in the soils. Several incineration technologies are available, including rotary kiln, fluidized bed and recirculating fluidized bed. Soils would be excavated, incinerated and placed back into the original excavation area. This alternative may be costly and does not consider treatment of inorganic compounds that may exist within the soils.

Off-site disposal of contaminated soils in an approved, secure landfill may effectively remove contaminated soils at the site and eliminate the potential for future surface water and ground water contamination resulting from contaminated soils leaching. Selective removal of highly contaminated soils ("hot spots") from small accessible pockets may be an attractive remedial approach for application of this technology. As noted, land disposal restrictions and pretreatment requirements will be considered with respect to the off-site disposal option.

7.2.4.4 Laboratory Testing

To assist in the determination of soil cleanup levels and the analysis of remedial alternatives, additional field investigation or laboratory bench scale testing may be recommended. These may include the collection of additional soils data relating to the distribution and levels of contaminants within the concerned soils at the site and determination of chemical transport properties of the soils. The results of the endangerment assessment will also be used in determining soil cleanup levels.

7.2.5 Air

The feasibility study will assess the present air quality at the site and determine the adequacy of aforementioned technologies for reducing and controlling the release of contaminants from and around the landfill to the atmosphere. Although air is not believed to be a primary migration pathway for significant contamination, alternatives will be evaluated and ambient contaminant levels established that will provide for environmentally safe and aesthetically favorable conditions. The possible air impact attributable to existing or proposed on-site treatment units will be addressed when appropriate as part of the feasibility study alternatives evaluation.

It is anticipated that a cap system could be proposed for the site to control or virtually eliminate surface infiltration into the landfill. As noted earlier, such a system would result in the subsequent reduction of leachate generation and migration, thereby lessening the future potential of surface water, shallow ground water and downstream soils contamination. Based on this premise, inferior air quality, if found to be characteristic of the landfill site during the feasibility study, could be significantly improved by the installation of a cap system that would prevent the uncontrolled release of volatile contaminants from the landfill and from leachate which has migrated downstream.

Air sampling will be performed at the site during the remedial investigation to establish present air quality levels within the atmosphere (see Section 6.3). These air quality data may then be utilized in the feasibility study to evaluate the possible need for remedial measures for air quality and, as appropriate, air releases from existing or proposed on-site treatment options.

7.3 DEVELOPMENT OF ALTERNATIVES

Technologies which have passed the screening process will then be used to form remedial alternatives. An alternative may consist of a single technology or a combination of technologies to address ground water, surface water, soil and/or air contamination. Best engineering judgment will be used to select those technologies and alternatives which appear most suited for implementation at the facility. The SARA requirements for considering alternate and innovative technologies will be incorporated into the alternatives development. Rationale will be compiled for rejecting technologies which do not appear to be applicable and were not included.

7.3.1 Summary of Alternatives Development

Based on the identification, development and screening process, a limited number of remedial alternatives will be identified for further in-depth analysis. This screening process will allow technologies which are clearly not applicable or relevant to be eliminated from further consideration.

7.4 DETAILED ANALYSIS OF ALTERNATIVES

7.4.1 Technical Evaluation

The first step in the detailed analysis of a potential alternative is the determination that a potential alternative is technically appropriate given specific site and source area conditions.

7.4.1.1 Performance

Expected performance of a particular alternative will be evaluated. The evaluation of performance will consider two factors: effectiveness and useful life. The effectiveness of an alternative will be evaluated in terms of the ability of the alternative to perform the intended remedial function. In addition to effectiveness, each alternative remedial action will be evaluated in terms of the projected service lives of the technologies of which it is comprised.

7.4.1.2 Reliability

The reliability of the alternative remedial actions will be evaluated as part of the technical analysis. The reliability evaluation will consider operation and maintenance (O&M) requirements and the demonstrated reliability of the technology at sites of similar characteristics. The demonstrated performance factor will be considered in terms of technologies that have been proven to be effective under waste and site conditions similar to those which are present at the Hercules/Picco disposal site.

7.4.1.3 Implementability

Implementability of each remedial alternative will be evaluated with respect to its relative ease of installation and the time required to affect a given level of response. The ease of installation will be considered in terms of constructability of a particular alternative. The constructability aspects will be determined based on conditions imposed by the physical characteristics of the landfill site and factors external to those of the site.

The time factor will be addressed in terms of the time to implement a remedial action control measure and the time it may take to see beneficial effects of the implemented controls. The implementation time will consider the time it takes for special studies, design, construction and any other factors which may be required for the actual implementation of an alternative.

7.4.1.4 Safety

Each alternative will be evaluated with respect to safety as it relates to potential threats to the safety of any nearby residents or environment as well as workers during implementation of the alternative. Alternatives would be designed to control risk during construction/implementation and will be evaluated in terms of the extent to which the final design can provide such safety during construction.

7.4.1.5 Summary of Technical Feasibility

The results of the technical evaluation will be compiled to compare the technical feasibility of the various alternatives. The alternatives will be presented in a matrix format to depict the key elements and differences relating to the technical evaluation factors. The results of this summary will present a matrix which would allow ranking on a technical basis of the various alternatives.

7.4.2 Institutional Issues

Institutional issues will be evaluated with respect to each of the alternative remedial actions in order to avoid delays or other complications during implementation of a remedial action. The alternatives will be assessed in terms of the effect that compliance with institutional issues would have on the implementation of that alternative. Institutional issues could include:

- o Permits
- o Other federal statutes and regulations
- o Community relations
- o Coordination with other agencies

In accordance with the requirements of SARA, applicable or Relevant and Appropriate Standards (ARARS) will be identified and addressed for each alternative as part of this feasibility study evaluation. Federal and State ARARS will be identified and the alternatives evaluated with respect to how the ARARS are met.

7.4.3 Environmental Assessment

For each of the remedial alternatives, an assessment of potential environmental impacts will be performed. This assessment will address two aspects of interest including:

- o Benefits which can be expected as a result of the remedial action.

- o Adverse effects of the response.

This evaluation will utilize the results of the Endangerment Assessment work which would have identified the environmental and public health concerns posed by the site. The ability of each alternative to mitigate these concerns will be evaluated.

Results of the environmental analysis for each alternative will be compiled and presented. The results will be presented in a format which allows comparison of various alternatives with respect to environmental effects.

7.4.4 Cost Analysis

7.4.4.1 Estimation of Costs

The alternative remedial actions will be evaluated within a cost analysis framework. These estimated costs will utilize data available from the remedial investigation along with any literature, data or information from remedial investigations performed at other similar sites.

The capital and annual cost components for each remedial action alternative will be estimated. These costs include expenditures required for equipment, labor and materials necessary for the installation of the remedial action.

Cost estimates for a particular remedial action would generally be compared using a present worth analysis. This would include both capital and annual costs for each alternative. Generally three factors would be needed as input to the present worth cost in addition to the cost estimates including: inflation/escalation rate, discount rate, and period of performance.

For each remedial action, cost sensitivities will be reviewed as appropriate to project the effect of variation in certain key specific assumptions which may vary and significantly impact the estimated cost of a particular alternative. The sensitivity review is generally concerned

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with those factors that could bring about a significant change in the overall estimated cost for an alternative with only a small change in the value of the factors.

The results of the cost analysis will be summarized for each of the remedial alternatives. These results will be presented in a format which will allow comparison between the various alternatives.

7.4.4.2 Cost Effectiveness Analysis

The various remedial alternatives will be compared with each other with respect to estimated costs and projected effectiveness. As part of the effectiveness comparison, Hercules, Inc. will consider the technical, public health, institutional, and environmental factors. For a particular source area, conditions or cleanup objectives may dictate factors considered significant enough to be used as distinct effectiveness measures.

The remedial alternatives will be assembled into a format that facilitates comparison of estimated cost along with effectiveness measures. As a result of this comparison analysis, the alternatives will be ranked in relative order according to cost effectiveness.

7.5 RECOMMENDED ALTERNATIVES

The feasibility study will include a summary of the remedial alternatives, and present the results of the analysis using appropriate summary tables and figures. The alternatives will be compared, including their advantages and disadvantage. At the end of this comparative analysis, the recommended alternatives will be identified, along with the basis for this recommendation.

7.6 FEASIBILITY STUDY REPORT

The feasibility study report will document and present the results of the feasibility study. This report will present the results of technology screening and development of alternatives, evaluation of the remedial alternatives, and cost effectiveness analysis. The report will also summarize and discuss the recommended alternative.

7.7 CONCEPTUAL ENGINEERING DESIGN

Following agreement of the recommended alternative, conceptual engineering design will be initiated for that alternative. Analysis in the feasibility study represents preliminary conceptual design and this work will be used as the basis for the concept design. Following agreement on the conceptual design, final engineering design work can be initiated for the construction/implementation work.

SECTION 8

SCHEDULE

It is anticipated that the Remedial Investigation and Feasibility Study for the Jefferson Landfill will take approximately twelve months from submittal of the Work Plan through final approval of the remedial plan. Figure 8.1 presents a schedule of activities required to complete the RI/FS within this time frame assuming initial approval of the Work Plan is obtained by July 24, 1987.

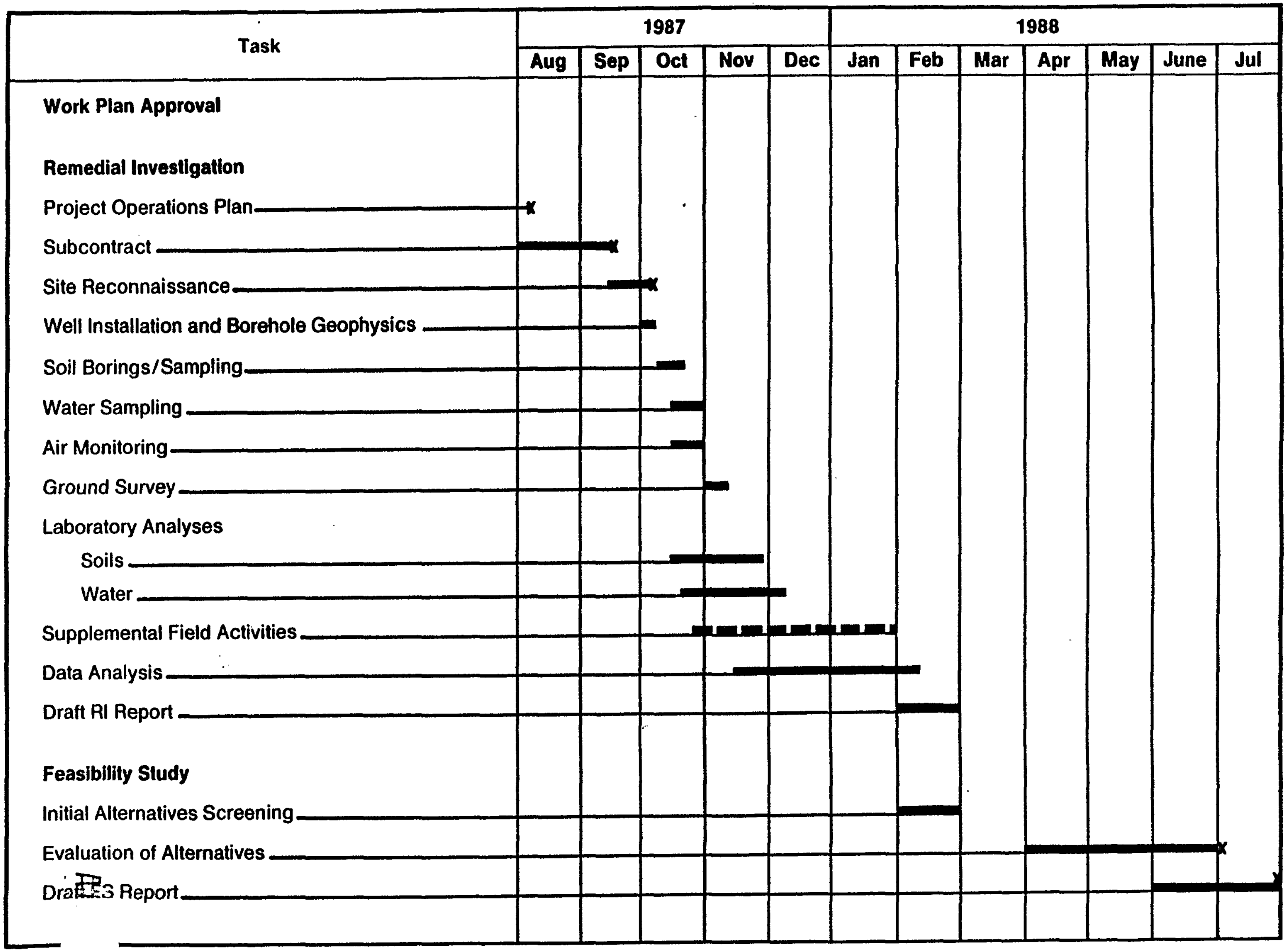


FIGURE 8-1 SCHEDULE FOR RI/FS OF JEFFERSON LANDFILL

AR300077

Test Well #4

Depth (Ft.)	Description
0 - 4	Soil
4 - 12	Black Shale
12 - 31	Red and Gray Shale
31 - 38	Coal (Pittsburgh Coal)
38 - 40	Gray Clay and Claystone
40 - 47	Limestone
47 - 58	Sandy Gray Shale
58 - 60	Sandstone

Water at 38 Feet

MA 08022

GEOLOGIC LOGS OF TEST WELLS
HERCULES, INC., SITE
JEFFERSON BOROUGH, PENNSYLVANIA

Test Well #1

Depth (Ft.)	Description
0 - 10	Clay
10 - 18	Sandy Gray Shale
18 - 30	Red Shale

Water at 18 Feet
0 Hr. Water Level 6 Feet

Test Well #2

Surface ele. 986.80
1040

Depth (Ft.)	Description
0 - 2	Soil
2 - 30	Sandy Gray Shale
30 - 34	Void (Pittsburgh Coal Mined)
34 - 38	Broken Material
38 - 53	Limestone

Water at Void, 30 Feet

Test Well #3

Depth (Ft.)	Description
0 - 14	Soil
14 - 29	Sandy Gray Shale
29 - 37	Coal (Pittsburgh Coal)
37 - 39	Gray Clay and Claystone
39 - 46	Limestone
46 - 59	Sandy Gray Slate
59 - 63	Sandstone

WESTON

DRILLING LOG

WELL NUMBER: MW-5
OWNER: HERCULES CHEMICAL
LOCATION: LANDFILL
ADDRESS: CLAIRTON, PA
TOTAL DEPTH: 200'
SURFACE ELEVATION: ≈ 1050'
WATER LEVEL: DRY
DRILLING COMPANY: MARTZ
DRILLING METHOD: Air Rotary
DATE DRILLED: 7/29/82
DRILLER: J. DILLER
HELPER:
LOG BY: RCJ

SKETCH MAP

NOTES: WELL STILL DRY AFTER 30 DAYS.

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0	6" STEEL CASING				0-20' Earth fill, silt and sand with some gravel.
					Saturated at 12'. Resin odor.
25					20'-24' Native subsoil, moist brown silt and sand.
					24'-27' TAN Siltstone, dry
					27'-38' Grey-green shale and siltstone. Cuttings damp at 35'.
					38'-41' Coal
					41'-48' Grey shale, dry.
					48'-50' Fine sandstone
50					50'-53' Lt. grey shale, fine standstone
					53'-67' Light grey shale
					68'-75' Black shale
75					75'-77' Grey siltstone
					77'-80' Black shale 80'-81' Grey siltstone
					81'-95' Black shale and siltstone
					95'-98' Dark grey siltstone
100					

* A.S.T.M. D1586

AR300081

WESTON

DRILLING LOG

WELL NUMBER: W-5 (CONT.) OWNER:

LOCATION: ADDRESS:

TOTAL DEPTH

SURFACE ELEVATION: WATER LEVEL:

DRILLING COMPANY: DRILLING METHOD: DATE DRILLED:

DRILLER: HELPER:

LOG BY:

* 116'
Left hole open for 90 min. H_2O at 68'. Set 6" steel casing to 111'. Two bags of cement in anulus set overnight. Blew out water and got no new water.

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
100					98'-106' Shale and coal
					106'-106.5' Grey clay
					106.5-116' Grey limestone * See Note Above
					116'-131' Grey limestone
125					
					131'-160' Grey shale and limestone, Dry.
150					160'-163' Red siltstone
	OPEN				
					163'-177' Grey shale
175					177'-179' Red shale
					179'-185' Grey siltstone and red fine standstone
					185'-186' Red shale
					186'-189' Grey siltstone
					189'-192' Red shale
					192'-199' Grey siltstone
200					199'-200' Red shale. END OF BORING. Well dry at completion

AR300082

* A.S.T.M. D1586

WESTON

DRILLING LOG

WELL NUMBER: MW-6
OWNER: HERCULES CHEMICAL
LOCATION: LANDFILL
ADDRESS: CLAIRTON, PA
TOTAL DEPTH: 290'
SURFACE ELEVATION: ≈ 990'
WATER LEVEL: DRY
DRILLING COMPANY: MARTZ
DRILLING METHOD: Air rotary
DATE DRILLED: 7/30/82 - 8/3/82
DRILLER: JOE DILLER
HELPER:
LOG BY: RCJ

SKETCH MAP

NOTES: WATER LEVELS - DTW	
8/30/82	270'
9/9/82	265'
9/28/82	249'

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0	6" Steel Casing				
					0-27' Fill-Tan Clay with strong resin odor. Thin bed of coal and clay at 27'
25					
					27'-36' Grey limestone, grading to shale
					36'-38' Grey limestone
	Open hole				38'-51' Sandy grey shale. (1400 Hours. Set 6' steel casing to 38'. 2 bags cement. Let set over weekend. Resumed 8/2/82)
50					51'-55' Grey limestone
					55-64' Grey sandy shale
					64'-66' Grey limestone
					66'-80' Grey siltstone
75					80'-82' Red shale
					82'-99' Grey siltston and shale
100					

* A.S.T.M D1586

AR300083

SHEET 1 OF 3

WESTON

SKETCH MAP

NOTES:

DRILLING LOG

WELL NUMBER: MW-6 (Cont.) OWNER:
LOCATION: ADDRESS:
TOTAL DEPTH
SURFACE ELEVATION: WATER LEVEL:
DRILLING COMPANY: DRILLING METHOD: DATE DRILLED:
DRILLER: HELPER:
LOG BY:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
100					99'-101' Red shale
					101'-126' Gray siltstone and shale
125					126'-127' Red shale 127'-138' Gray green shale and siltstone
					138'-139' Red shale
					139'-142' Gray sandy shale 142'-143' Red shale
					143'-153' Gray siltstone
50					153'-156' Red shale
					156'-162' Gray siltstone
					162'-165' Red shale
					165'-174' gray siltstone (Paused 15 min. at 170'. Dry.)
75					174'-190' Red siltstone and shale
					190'-205' Grey siltsone (Paused for 15 min. Boring is dry.)
00					

AR300084

* A.S.T.M. D1586

SHEET 2 OF 3

WESTON

DRILLING LOG

WELL NUMBER: MW-6 (Cont.)
OWNER:
LOCATION:
ADDRESS:
TOTAL DEPTH
SURFACE ELEVATION:
WATER LEVEL:
DRILLING COMPANY:
DRILLING METHOD:
DATE DRILLED:
DRILLER:
HELPER:
LOG BY:

SKETCH MAP

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
200					205'-250' Grey siltstone and shale
225					
					(Sat overnight at 250'. Dry in the morning. 8/3/82)
250					
					250'-255' Grey siltstone and shale
					255'-258' Red shale
					258'-270' Grey siltstone and shale
					270'-272' Red shale
					272'-279' Grey siltstone
275					279'-280' Tan sandstone
					280'-290' Grey siltstone and shale
					290' End of boring. Dry at completion.
300					

AR300085

* A.S.T.M. D1586

SHEET 3 OF 3

WESTON

DRILLING LOG

WELL NUMBER: TW-8 OWNER: Hercules, Inc.

LOCATION: Picco Resins Landfill ADDRESS: Jefferson Landfill

TOTAL DEPTH:

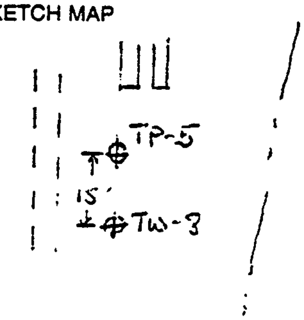
SURFACE ELEVATION: WATER LEVEL:

DRILLING COMPANY: Martz DRILLING METHOD: Air Rotary DATE DRILLED: 8/2/83

DRILLER: Joe D HELPER:

LOG BY: R. C. Johnson

SKETCH MAP



NOTES:

15' downslope of TP-15

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
0					0'-8' Soil fill, black oil, stain, strong odor, damp.
10					8'-20' Brown silt and clay. Black oily stain, Moist, wet.
20					22'-24' Grey limestone - dry.
					24'-26' Red shale - dry.
30					Set casing at 26'. Used 1 bag Portland cement. Blow out casing on 8/3. No water coming in. Completed boring to 40 in. in red shale. Dry at completion,
40					

AR300086

* A.S.T.M. D1586

SHEET ___ OF ___

2A has been renumbered as TW-7

WESTON

DRILLING LOG

WELL NUMBER: 2A

LOCATION: Jefferson Borough

SURFACE ELEVATION:

DRILLING COMPANY: Martz

DRILLER:

LOG BY: W. Beers

OWNER: Picco Resins

ADDRESS: Clairton, PA

TOTAL DEPTH: 96 feet

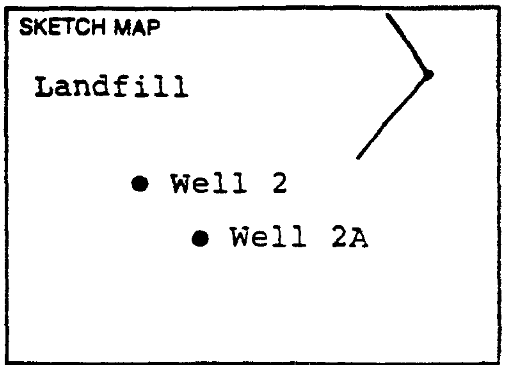
WATER LEVEL:

DRILLING METHOD: Air Rotary

DATE DRILLED: 6/15/84

HELPER:

SKETCH MAP



NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
					0 - 10' Soil and fractured bedrock
					10 - 51' Gray shale
					51 - 67' Gray sandstone
					67 - 74' Gray shale
					74 - 75' Coal
					75 - 88' Gray sandy shale
					88 - 93' Coal
					93 - 96' Gray sandstone

AR300087

* A.S.T.M. D1586

SHEET ___ OF ___

W1 has been renumbered as TW-11

WESTON

DRILLING LOG

WELL NUMBER: W-1

LOCATION: Jefferson Borough

SURFACE ELEVATION:

DRILLING COMPANY: MARTZ

DRILLER: W. BEERS

LOG BY:

OWNER: PICCO RESINS

ADDRESS: Clairton, PA

TOTAL DEPTH: 18 feet

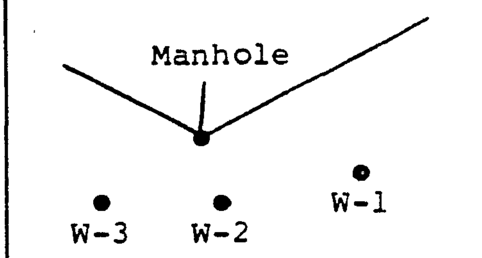
WATER LEVEL:

DRILLING METHOD: Air Rotary

DATE DRILLED: 6/13/84

HELPER:

SKETCH MAP



NOTES.

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
					0 - 15' Soil
					15 - 18' Bedrock
					8 inch hole.
					6 inch steel casing - field slotted 4 feet from top;
					last three feet not slotted. Annular space
					backfilled with pea gravel.

AR300088

* ASTM D1586

SHEET ____ OF ____

w2 has been renumbered as TW-10

WESTON

SKETCH MAP

DRILLING LOG

WELL NUMBER: W-2
OWNER: PICCO RESINS
LOCATION: Jefferson Borough
ADDRESS: Clairton, PA
TOTAL DEPTH: 20.5 feet
SURFACE ELEVATION:
WATER LEVEL:
DRILLING COMPANY: MARTZ
DRILLING METHOD: Air Rotary
DATE DRILLED: 6/14/84
DRILLER: W. BEERS
HELPER:
LOG BY:

NOTES:

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
					0 - 7' Soil fill
					7 - 12.5' Dark gray soil
					12.5 - 17.5' Resin contaminated soil
					17.5 - 20.5' Bedrock
					10 inch hole.
					6 inch steel casing - field slotted 4 feet from top, last three feet not slotted. Annular space backfilled with pea gravel.

AR300089

* A.S.T.M. D1586

SHEET ___ OF ___

W3 has been renumbered as TW-9

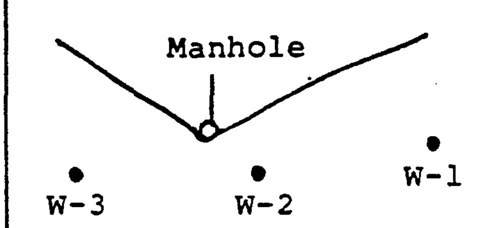
WESTON

DRILLING LOG

WELL NUMBER: W-3
LOCATION: Jefferson Borough
SURFACE ELEVATION:
DRILLING COMPANY: MARTZ
DRILLER: W. BEERS
LOG BY:

OWNER: Picco Resins
ADDRESS: Clairton, PA
TOTAL DEPTH: 25 feet
WATER LEVEL:
DRILLING METHOD: Air Rotary
DATE DRILLED: 6/14/84
HELPER:

SKETCH MAP



NOTES

DEPTH (FEET)	GRAPHIC LOG	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS*	DESCRIPTION / SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
					0 - 6' Clean soil fill
					6 - 18' Resin contaminated soil
					18 - 22' Oil, resin, water and soil
					22 - 25' Bedrock
					10 inch hole
					6 inch steel casing - field slotted 4 feet
					from top. Last three feet not slotted.
					Annular space backfilled with pea gravel.

AR300090

* A.S.T.M. D1586

SHEET ____ OF ____

AR300091

ANALYSIS OF

MONITOR WELL SAMPLES

JULY, 1981

NUS CORPORATION

A Halliburton Company

Analyses are performed in accordance with "Guidelines Establishing Test Procedures for the Analysis of Pollutants", 40 CFR 136.

The reference methods for organic toxic pollutant analyses are the proposed regulations of December 3, 1979 (Federal Register, Vol. 44, No. 233).

NUS CORPORATION
CYRUS WM RICE DIVISION
-YTICAL SERVICES LABORATORY
NOBLE AVENUE • PITTSBURGH, PA. 15205
412 788-1080

Rice Sample No. 11070284
Project No. 0
Project Mgr. D.P. Bour
Date Received 7-9-81
Time 10 AM
Date Sampled 7-7-81
Date Reported 8-19-81

HERCULES, INCORPORATED
Picco Resins
120 State Street
Clairton, PA 15025

Attn: John Y. Penn

Source 7391-34 Well #1

Test results reported in mg/liter unless otherwise noted. P.O. #031-17469

	DETERMINATION*	DATE	RICE	
0	Acidity Free ($CaCO_3$)			
020	Acidity Total ($CaCO_3$)			
030	Alkalinity M.O. ($CaCO_3$)		419	
0	Alkalinity Pht. ($CaCO_3$)		0	
050	Aluminum (Al)		2.8	
060	Ammonia ( )			
0	Arsenic (As)		0.006	
0	Barium (Ba)		0.2	
090	Bicarbonate ($CaCO_3$)			
0	Bio Oxygen Demand (O_2)		10	
0	Cadmium (Cd)		<0.01	
120	Calcium (Ca)			
130	Carbon Inorganic (C)			
0	Carbon Organic (C)		62	
150	Carbon Total (C)			
160	Carbonate (CO_3)			
0	Chem. Oxygen Dem. (O_2)		190	
0	Chloride (Cl.)		201	
190	Chromate (CrO_4)			
0	Chromium (Cr^{+6})			
0	Chromium Total (Cr)		<0.03	
220	Color (APHA)			
0	Copper (Cu)			
0	Cyanide Free (CN)			
250	Cyanide Total (CN)		<0.005	
260	Fluoride (F)		1.3	
0	Hardness ($CaCO_3$)			
0	Hydroxide (OH)			
290	Iron ( ) (Fe)			
0	Iron Total (Fe)		47	
0	Lead (Pb)		<0.05	
320	Magnesium (Mg)			
0	Manganese (Mn)		5.4	
0	Mercury (Hg), µg/1		1.15	
350	Nickel (Ni)			
360	Nitrate (N)		0.6	
0	Nitrite ( )			

	DETERMINATION*	DATE	RICE	
380	Nitrogen, Kjeldahl (N)			
390	Odor, Method:			
400	pH		6.9	
410	Phenolic Cpds. (Phenol)		0.042	
420	Phosphorus Ortho ( )			
430	Phosphorus Total ( )			
440	Potassium (K)			
450	Selenium (Se)		<0.005	
460	Silica Soluble ( )			
470	Silica Total ( )			
480	Silver (Ag)		<0.02	
490	Sodium (Na)		172	
500	Solids Dissolved		1080	
510	Solids Suspended		180	
520	Solids Total		1350	
530	Solids Non-Settleable			
540	Solids Settleable			
550	Solids Volatile			
560	Solvent Extract (Oil) Method:		2	
570	Sp. Cond., 25°C µmhos		1600	
580	Sulfate (SO_4)		165	
590	Sulfide (S)			
600	Surfactants (MBAS)			
610	Tin (Sn)			
620	Turbidity (JTU)			
630	Zinc (Zn)		0.06	
640	Miscellaneous			
*	T.O.H.			
	Boron		31	

AR300094

Special Instructions (Methods, Etc.)
* T.O.H. results to follow.

TASK	MO	DAY	RICE	NBR	IDENT	TYPE	AMOUNT

NUS CORPORATION
A Halliburton Company

PROJECT NO. Q
PROJECT MGR. D P Bour
RICE SAMPLE NO. 11070284
DATE RECEIVED 7-9-81
TIME 10 AM
DATE REPORTED 7-30-81
DATE SAMPLED 7-7-81
CLIENT NO.

P.O.# 031-17469

Sample Source 7391-34 Well #1

DETERMINATION		mg/l		DETERMINATION		mg/l	
	FORM 2-C Part V-A				**Parts V-C**		
a	Bio. Oxygen Demand				Metals, Cyanide, & Total Phenols		
b	Chem. Oxygen Demand			1M	Antimony, Total		
c	Total Organic Carbon			2M	Arsenic, Total		
d	Total Suspended Solids			3M	Beryllium, Total		
e	Ammonia (N)			4M	Cadmium, Total		
i	pH			5M	Chromium, Total		
	Part V-B			6M	Copper, Total		
a	Bromide			7M	Lead, Total		
b	Chlorine, T. Residual			8M	Mercury, Total		
c	Color (APHA Units)			9M	Nickel, Total		
d	Fecal Coliform/100ml			10M	Selenium, Total		
e	Fluoride			11M	Silver, Total		
f	Nitrate-Nitrite (N)			12M	Thallium, Total		
g	Nitrogen, T. Organic (N)			13M	Zinc, Total		
h	Oil and Grease			14M	Cyanide, Total		
i	Phosphorus, T. (P)			15M	Phenols, Total		
k	Sulfate (SO_4)						
l	Sulfide (S)						
m	Sulfite (SO_3)				DIOXIN		
n	Surfactants				2,3,7,8 Tetrachlorodibenzo-P-dioxin (Screening)		
o	Aluminum, Total						
p	Barium, Total						
q	Boron, Total						
r	Cobalt, Total						
s	Iron, Total						
t	Magnesium, Total						
u	Molybdenum, Total						
v	Manganese, Total						
w	Tin, Total						
x	Titanium, Total						

On page 3, Column B lists the minimun limits which are normally reported. If a curs in Column A of a requested determination, the limit in Column B should be used for permit application and compliance reports.

AR300095

WL-35-7-80

DETERMINATION	A µg/l	B µg/l
Part V-C (Con't)		
GC/MS Fraction-Volatile Compounds		*
1V Acrolein		<100
Acrylonitrile		<100
Benzene	124/127	<10
4V Bis (Chloromethyl) Ether		<10
5V Bromoform		<10
6V Carbon Tetrachloride		<10
7V Chlorobenzene		<10
8V Chlorodibromomethane		<10
9V Chloroethane		<10
0V 2-Chloroethylvinyl Ether		<10
1V Chloroform	2/2	<10
12V Dichlorobromomethane		<10
3V Dichlorodifluoromethane		<10
4V 1,1-Dichloroethane		<10
15V 1,2-Dichloroethane		<10
6V 1,1-Dichloroethylene		<10
7V 1,2-Dichloropropane		<10
18V 1,3-Dichloropropylene		<10
19V Ethylbenzene	11/10	<10
V Methyl Bromide		<10
1V Methyl Chloride		<10
22V Methylene Chloride	15/19	<10
3V 1,1,2,2-Tetrachloroethane		<10
4V Tetrachloroethylene		<10
25V Toluene	8/8	<10
V 1,2-Trans-Dichloroethylene		<10
1,1,1-Trichloroethane		<10
28V 1,1,2-Trichloroethane		<10
V Trichloroethylene	<1/<1	<10
V Trichlorofluoromethane	1/1	<10
31V Vinyl chloride		<10
GC/MS Fraction — Acid Compounds		NA
A 2-Chlorophenol		<25
2A 2,4-Dichlorophenol		<25
3A 2,4-Dimethylphenol		<25
A 4,6-Dinitro-o-cresol		<250
5A 2,4-Dinitrophenol		<250
6A 2-Nitrophenol		<25
A 4-Nitrophenol		<25
A p-Chloro-m-cresol		<25
9A Pentachlorophenol		<25
A Phenol		<25
A 2,4,6-Trichlorophenol		<25
GC/MS Fraction Base Neutral Compounds		NA
1B Acenaphthene		<10

DETERMINATION	A µg/l	B µg/l
Part V-C (Con't)		
2B Acenaphthylene		<10
3B Anthracene		<10
4B Benzidine		<10
5B Benzo (a) Anthracene		<10
6B Benzo (a) Pyrene		<10
7B 3,4-Benzofluoranthene		<10
8B Benzo (ghi) Perylene		<25
9B Benzo (k) Fluoranthene		<10
10B Bis (2-Chloroethoxy) Methane		<10
11B Bis (2-Chloroethyl) Ether		<10
12B Bis (2-Chloroisopropyl) Ether		<10
13B Bis (2-Ethylhexyl) Phthalate		<10
14B 4-Bromophenyl Phenyl Ether		<10
15B Butyl Benzyl Phthalate		<10
16B 2-Chloronaphthalene		<10
17B 4-Chlorophenyl Phenyl Ether		<10
18B Chrysene		<10
19B Dibenzo (a,h) Anthracene		<25
20B 1,2-Dichlorobenzene		<10
21B 1,3-Dichlorobenzene		<10
22B 1,4-Dichlorobenzene		<10
23B 3,3'-Dichlorobenzidine		<10
24B Diethyl Phthalate		<10
25B Dimethyl Phthalate		<10
26B Di-N-Butyl Phthalate		<10
27B 2,4-Dinitrotoluene		<10
28B 2,6-Dinitrotoluene		<10
29B Di-N-Octyl Phthalate		<10
30B 1,2-Diphenylhydrazine (as Azobenzene)		<10
31B Fluoranthene		<10
32B Fluorene		<10
33B Hexachlorobenzene		<10
34B Hexachlorobutadiene		<10
35B Hexachloro-cyclopentadiene		<10
36B Hexachloroethane		<10
37B Indeno (1,2,3 cd) Pyrene		<25

DETERMINATION	A µg/l	B µg/l
Part V-C (Con't)		
38B Isophorone		<10
39B Naphthalene		<10
40B Nitrobenzene		<10
41B N-Nitrosodi-methylamine		<50
42B N-Nitrosodi-N-Propylamine		<10
43B N-Nitrosodi-phenylmine		<10
44B Phenanthrene		<10
45B Pyrene		<10
46B 1,2,4-Trichloro-benzene		<10
GC/EC Fraction Pesticides		NA
1P Aldrin		<10
2P α BHC		<10
3P β BHC		<10
4P γ BHC		<10
5P δ BHC		<10
6P Chlordane		<20
7P 4-4' DDT		<10
8P 4-4' DDE		<10
9P 4-4' DDD		<10
10P Dieldrin		<10
11P α Endosulfan		<10
12P β Endosulfan		<10
13P Endosulfan Sulfate		<10
14P Endrin		<10
15P Endrin Aldehyde		<20
16P Heptachlor		<10
17P Heptachlor Epoxide		<10
18P PCB-1242		<40
19P PCB-1254		<40
20P PCB-1221		<40
21P PCB-1232		<40
22P PCB-1248		<40
23P PCB-1260		<40
24P PCB-1016		<40
25P Toxaphene		<20

NA - Not Applicable

* Quality control duplicate

	Date Extracted	Date Injected	Conc. Factor	Standard	Book & Page No.
ACID GC/MS					
GC/MS VOA	--------	7/21/81	1.0	Supelco CD Purgeables	13-81-98
PEST. GC					

AR300096

NUS CORPORATION

CYRUS WM. RICE DIVISION

ANALYTICAL SERVICES LABORATORY
5 NOBLE AVENUE • PITTSBURGH, PA. 15205
412-343-9200

Rice Sample No. 11070284

Project No. 0

Project Mgr. D.P. Bour

Date Received 7-9-81

Time 10 AM

Date Sampled 7-7-81

Date Reported 8-19-81

HERCULES, INCORPORATED
Picco Resins
120 State Street
Clairton, PA 15025

Attn: John Y. Penn

Sample Source 7391-34 Well #1

Test results reported in ug/l unless otherwise noted. P.O. #031-17469

Rice Sample No.		
	Endrin	< 0.01
	Lindane	0.01
	Methoxychlor	< 0.05
	Toxaphene	< 0.25
	Styrene	< 1 mg/l

AR300097

TASK MO DAY RICE NBR IDENT TYPE AMOUNT

10 11 12 22 25 26 33 35 47 50 54 56 63

NUS CORPORATION
A Halliburton Company

PROJECT NO. 0

PROJECT MGR. D.P. Bour

RICE SAMPLE NO. 11070285

DATE RECEIVED 7-9-81

TIME 10 AM

DATE REPORTED 7-30-81

DATE SAMPLED 7-7-81

CLIENT NO. P.O.#031-17469

Sample Source 7391-35 Well #2

	DETERMINATION	mg/l			DETERMINATION	mg/l	
	FORM 2-C Part V-A				Parts V-C		
a	Bio. Oxygen Demand				Metals, Cyanide, & Total Phenols		
b	Chem. Oxygen Demand			1M	Antimony, Total		
c	Total Organic Carbon			2M	Arsenic, Total		
d	Total Suspended Solids			3M	Beryllium, Total		
e	Ammonia (N)			4M	Cadmium, Total		
i	pH			5M	Chromium, Total		
	Part V-B			6M	Copper, Total		
a	Bromide			7M	Lead, Total		
b	Chlorine, T. Residual			8M	Mercury, Total		
c	Color (APHA Units)			9M	Nickel, Total		
d	Fecal Coliform/100ml			10M	Selenium, Total		
e	Fluoride			11M	Silver, Total		
f	Nitrate-Nitrite (N)			12M	Thallium, Total		
g	Nitrogen, T. Organic (N)			13M	Zinc, Total		
h	Oil and Grease			14M	Cyanide, Total		
i	Phosphorus, T. (P)			15M	Phenols, Total		
k	Sulfate (SO_4)						
l	Sulfide (S)						
m	Sulfite (SO_3)				DIOXIN		
n	Surfactants				2,3,7,8 Tetrachlorodibenzo-P-dioxin (Screening)		
o	Aluminum, Total						
p	Barium, Total						
q	Boron, Total						
r	Cobalt, Total						
s	Iron, Total						
t	Magnesium, Total						
u	Molybdenum, Total						
v	Manganese, Total						
w	Tin, Total						
x	Titanium, Total						

On page 3, Column B lists the minimum working limits which are normally reported. If a blank occurs in Column A of a requested determination, the limit in Column B should be used for permit application and compliance reports.

AR300098

Rice #11070285 Date Reported: 7-30-81

	DETERMINATION	A µg/l	B µg/l
	Part V-C (Con't)		
	GC/MS Fraction-Volatile Compounds		
1V	Acrolein		<100
2V	Acrylonitrile		<100
3V	Benzene	109	<10
4V	Bis (Chloromethyl) Ether		<10
5V	Bromoform		<10
6V	Carbon Tetrachloride		<10
7V	Chlorobenzene		<10
8V	Chlorodibromomethane		<10
9V	Chloroethane		<10
10V	2-Chloroethylvinyl Ether		<10
11V	Chloroform	1	<10
12V	Dichlorobromomethane		<10
V	Dichlorodifluoromethane		<10
14V	1,1-Dichloroethane		<10
15V	1,2-Dichloroethane		<10
V	1,1-Dichloroethylene		<10
V	1,2-Dichloropropane		<10
18V	1,3-Dichloropropylene		<10
V	Ethylbenzene	33	<10
V	Methyl Bromide		<10
21V	Methyl Chloride		<10
22V	Methylene Chloride	13	<10
V	1,1,2,2-Tetrachloroethane		<10
24V	Tetrachloroethylene		<10
25V	Toluene	535	<10
V	1,2-Trans-Dichloroethylene		<10
27V	1,1,1-Trichloroethane		<10
V	1,1,2-Trichloroethane		<10
V	Trichloroethylene	<1	<10
30V	Trichlorofluoromethane	1	<10
31V	Vinyl chloride		<10
	GC/MS Fraction — Acid Compounds	NA	
1A	2-Chlorophenol		<25
2A	2,4-Dichlorophenol		<25
A	2,4-Dimethylphenol		<25
A	4,6-Dinitro-o-cresol		<250
5A	2,4-Dinitrophenol		<250
A	2-Nitrophenol		<25
A	4-Nitrophenol		<25
8A	p-Chloro-m-cresol		<25
9A	Pentachlorophenol		<25
A	Phenol		<25
A	2,4,6-Trichlorophenol		<25
	GC/MS Fraction Base Neutral Compounds	NA	
B	Acenaphthene		<10

	DETERMINATION	A µg/l	B µg/l
	Part V-C (Con't)		
2B	Acenaphthylene		<10
3B	Anthracene		<10
4B	Benzidine		<10
5B	Benzo (a) Anthracene		<10
6B	Benzo (a) Pyrene		<10
7B	3,4-Benzofluoranthene		<10
8B	Benzo (ghi) Perylene		<25
9B	Benzo (k) Fluoranthene		<10
10B	Bis (2-Chloroethoxy) Methane		<10
11B	Bis (2-Chloroethyl) Ether		<10
12B	Bis (2-Chloroisopropyl) Ether		<10
13B	Bis (2-Ethylhexyl) Phthalate		<10
14B	4-Bromophenyl Phenyl Ether		<10
15B	Butyl Benzyl Phthalate		<10
16B	2-Chloronaphthalene		<10
17B	4-Chlorophenyl Phenyl Ether		<10
18B	Chrysene		<10
19B	Dibenzo (a,h) Anthracene		<25
20B	1,2-Dichlorobenzene		<10
21B	1,3-Dichlorobenzene		<10
22B	1,4-Dichlorobenzene		<10
23B	3,3'-Dichlorobenzidine		<10
24B	Diethyl Phthalate		<10
25B	Dimethyl Phthalate		<10
26B	Di-N-Butyl Phthalate		<10
27B	2,4-Dinitrotoluene		<10
28B	2,6-Dinitrotoluene		<10
29B	Di-N-Octyl Phthalate		<10
30B	1,2-Diphenylhydrazine (as Azobenzene)		<10
31B	Fluoranthene		<10
32B	Fluorene		<10
33B	Hexachlorobenzene		<10
34B	Hexachlorobutadiene		<10
35B	Hexachloro-cyclopentadiene		<10
36B	Hexachloroethane		<10
37B	Indeno (1,2,3 cd) Pyrene		<25

	DETERMINATION	A µg/l	B µg/l
	Part V-C (Con't)		
38B	Isophorone		<10
39B	Naphthalene		[illegible]
40B	Nitrobenzene		[illegible]
41B	N-Nitrosodi-methylamine		<50
42B	N-Nitrosodi-N-Propylamine		<10
43B	N-Nitrosodi-phenylmine		<10
44B	Phenanthrene		<10
45B	Pyrene		<10
46B	1,2,4-Trichloro-benzene		<10
	GC/EC Fraction Pesticides	NA	
1P	Aldrin		<10
2P	α BHC		<10
3P	β BHC		<10
4P	γ BHC		<10
5P	δ BHC		<10
6P	Chlordane		<20
7P	4-4' DDT		<10
8P	4-4' DDE		<10
9P	4-4' DDD		<10
10P	Dieldrin		<10
11P	α Endosulfan		<10
12P	β Endosulfan		<10
13P	Endosulfan Sulfate		[illegible]
14P	Endrin		<10
15P	Endrin Aldehyde		<20
16P	Heptachlor		<10
17P	Heptachlor Epoxide		<10
18P	PCB-1242		<40
19P	PCB-1254		<40
20P	PCB-1221		<40
21P	PCB-1232		<40
22P	PCB-1248		<40
23P	PCB-1260		<40
24P	PCB-1016		<40
25P	Toxaphene		<20

NA-Not applicable

	Date Extracted	Date Injected	Conc. Factor	Standard	Book & Page No.
ACID MS					
GC/MS					AR300099
A MS	--	7/22/81	1.0	Supelco CD Purgeables	28-81-9 29-81-1
PEST. GC					

NUS CORPORATION

A Halliburton Company

Analyses are performed in accordance with "Guidelines Establishing Test Procedures for the Analysis of Pollutants", 40 CFR 136.

The reference methods for organic toxic pollutant analyses are the proposed regulations of December 3, 1979 (Federal Register, Vol. 44, No. 233).

NUS CORPORATION

CYRUS WM RICE DIVISION

ALYTICAL SERVICES LABORATORY
15 NOBLE AVENUE • PITTSBURGH, PA. 15205
412-343-9200

Rice Sample No. 11070285

Project No.	Q	Project Mgr.	D.P. Bour
Date Received	7-9-81	Time	10 AM
Date Sampled	7-7-81	Date Reported	8-19-81

HERCULES, INCORPORATED
Picco Resins
120 State Street
Clairton, PA 15025

Attn: John Y. Penn

Sample Source 7391-35 Well #2

Test results reported in mg/liter unless otherwise noted. P.O. #031-17469

	DETERMINATION*	DATE	RICE	
010	Acidity Free ($CaCO_3$)			
020	Acidity Total ($CaCO_3$)			
030	Alkalinity M.O. ($CaCO_3$)		266	
040	Alkalinity Pht. ($CaCO_3$)		0	
050	Aluminum (Al)		2.6	
060	Ammonia ( )			
070	Arsenic (As)		0.007	
080	Barium (Ba)		<0.2	
090	Bicarbonate ($CaCO_3$)			
100	Bio Oxygen Demand (O_2)		24	
110	Cadmium (Cd)		<0.01	
120	Calcium (Ca)			
130	Carbon Inorganic (C)			
140	Carbon Organic (C)		98	
150	Carbon Total (C)			
160	Carbonate (CO_3)			
170	Chem. Oxygen Dem. (O_2)		320	
180	Chloride (Cl)		59	
190	Chromate (CrO_4)			
200	Chromium (Cr^{+6})			
210	Chromium Total (Cr)		<0.03	
220	Color (APHA)			
230	Copper (Cu)			
240	Cyanide Free (CN)			
250	Cyanide Total (CN)		<0.005	
260	Fluoride (F)		6.7	
270	Hardness ($CaCO_3$)			
280	Hydroxide (OH)			
290	Iron ( ) (Fe)			
300	Iron Total (Fe)		17	
310	Lead (Pb)		<0.05	
320	Magnesium (Mg)			
330	Manganese (Mn)		3.5	
340	Mercury (Hg), µg/1		<0.2	
350	Nickel (Ni)			
360	Nitrate (N)		0.2	
370	Nitrite ( )			

	DETERMINATION*	DATE	RICE	
380	Nitrogen, Kjeldahl (N)			
390	Odor, Method:			
400	pH		6.3	
410	Phenolic Cpds. (Phenol)		0.448	
420	Phosphorus Ortho ( )			
430	Phosphorus Total ( )			
440	Potassium (K)			
450	Selenium (Se)		<0.005	
460	Silica Soluble ( )			
470	Silica Total ( )			
480	Silver (Ag)		<0.02	
490	Sodium (Na)		92	
500	Solids Dissolved		480	
510	Solids Suspended		95	
520	Solids Total		700	
530	Solids Non-Settleable			
540	Solids Settleable			
550	Solids Volatile			
560	Solvent Extract (Oil) Method:		83	
570	Sp. Cond., 25°C µmhos		775	
580	Sulfate (SO_4)		40	
590	Sulfide (S)			
600	Surfactants (MBAS)			
610	Tin (Sn)			
620	Turbidity (JTU)			
630	Zinc (Zn)		0.09	
640	Miscellaneous			
*	T.O.H.			
	Boron		28	

*Special Instructions (Methods, Etc.)
* T.O.H. results to follow.

AR300101

PROJ	TASK	MO	DAY	RICE	NBR	IDENT	TYPE	AMOUNT
7 10	11 12	22	25	26	33	35 47	50 54	56 63

NUS CORPORATION
CYRUS WM. RICE DIVISION
ANALYTICAL SERVICES LABORATORY
15 NOBLE AVENUE • PITTSBURGH, PA. 15205
412-343-9200

Project No. 0
Date Received 7-9-81
Date Sampled 7-7-81

Project Mgr. D.P. Bour
Time 10 AM
Date Reported 8-19-81

HERCULES, INCORPORATED
Picco Resins
120 State Street
Clairton, PA 15025

Attn: John Y. Penn

Sample Source 7391-35 Well #2

Test results reported in ug/1 unless otherwise noted. P.O. #031-17469

Rice Sample No.		
	Endrin	< 0.01
	Lindane	< 0.005
	Methoxychlor	< 0.05
	Toxaphene	< 0.25
	Styrene	< 1 mg/l

AR300102

PROJ	TASK	MO	DAY	RICE	NBR	IDENT	TYPE	AMOUNT
7 10	11 12	22	25	26	33	35 47	50 54	56 63

NUS CORPORATION
A Halliburton Company

PROJECT NO. Q

PROJECT MGR. D P Bour

RICE SAMPLE NO. 11070347

DATE RECEIVED 7-10-81

TIME 3 PM

DATE REPORTED

DATE SAMPLED 7-9-81

CLIENT NO.

P.O.# 031-17469

Sample Source 7391-36 Well #3 2:55 PM

DETERMINATION	mg/l		DETERMINATION	mg/l	
FORM 2-C Part V-A			Parts V-C		
a Bio. Oxygen Demand			Metals, Cyanide, & Total Phenols		
b Chem. Oxygen Demand			1M Antimony, Total		
c Total Organic Carbon			2M Arsenic, Total		
d Total Suspended Solids			3M Beryllium, Total		
e Ammonia (N)			4M Cadmium, Total		
i pH			5M Chromium, Total		
Part V-B			6M Copper, Total		
a Bromide			7M Lead, Total		
b Chlorine, T. Residual			8M Mercury, Total		
c Color (APHA Units)			9M Nickel, Total		
d Fecal Coliform/100ml			10M Selenium, Total		
e Fluoride			11M Silver, Total		
f Nitrate-Nitrite (N)			12M Thallium, Total		
g Nitrogen, T. Organic (N)			13M Zinc, Total		
h Oil and Grease			14M Cyanide, Total		
i Phosphorus, T. (P)			15M Phenols, Total		
k Sulfate (SO_4)					
l Sulfide (S)					
m Sulfite (SO_3)			DIOXIN		
n Surfactants			2,3,7,8 Tetrachlorodibenzo-P-dioxin (Screening)		
o Aluminum, Total					
p Barium, Total					
q Boron, Total					
r Cobalt, Total					
s Iron, Total					
t Magnesium, Total					
u Molybdenum, Total					
v Manganese, Total					
w Tin, Total					
x Titanium, Total					

On page 3, Column B lists the minimum working limits which are normally reported. If a blank occurs in Column A of a requested determination, the limit in Column B should be used for permit application and compliance reports.

Rice# 11070347
Date Reported 7-30-81

WL-36

DETERMINATION	A µg/l	B µg/l
Part V-C (Con't)		
GC/MS Fraction-Volatile Compounds		
Acrolein		<100
Acrylonitrile		<100
3V Benzene	446	<10
4V Bis (Chloromethyl) Ether		<10
5V Bromoform		<10
6V Carbon Tetrachloride		<10
7V Chlorobenzene		<10
8V Chlorodibromomethane		<10
9V Chloroethane		<10
10V 2-Chloroethylvinyl Ether		<10
11V Chloroform	4	<10
12V Dichlorobromomethane		<10
13V Dichlorodifluoromethane		<10
14V 1,1-Dichloroethane		<10
15V 1,2-Dichloroethane		<10
16V 1,1-Dichloroethylene		<10
17V 1,2-Dichloropropane		<10
18V 1,3-Dichloropropylene		<10
19V Ethylbenzene	61	<10
20V Methyl Bromide		<10
21V Methyl Chloride		<10
22V Methylene Chloride	10	<10
23V 1,1,2,2-Tetrachloroethane		<10
24V Tetrachloroethylene		<10
25V Toluene	846	<10
1,2-Trans-Dichloroethylene		<10
27V 1,1,1-Trichloroethane	< 1	<10
28V 1,1,2-Trichloroethane		<10
29V Trichloroethylene		<10
30V Trichlorofluoromethane	1	<10
31V Vinyl chloride		<10
GC/MS Fraction — Acid Compounds		NA
1A 2-Chlorophenol		<25
2A 2,4-Dichlorophenol		<25
3A 2,4-Dimethylphenol		<25
4A 4,6-Dinitro-o-cresol		<250
5A 2,4-Dinitrophenol		<250
6A 2-Nitrophenol		<25
7A 4-Nitrophenol		<25
8A p-Chloro-m-cresol		<25
9A Pentachlorophenol		<25
10A Phenol		<25
11A 2,4,6-Trichlorophenol		<25
GC/MS Fraction Base Neutral Compounds		NA
1B Acenaphthene		<10

DETERMINATION	A µg/l	B µg/l
Part V-C (Con't)		
2B Acenaphthylene		<10
3B Anthracene		<10
4B Benzidine		<10
5B Benzo (a) Anthracene		<10
6B Benzo (a) Pyrene		<10
7B 3,4-Benzofluoranthene		<10
8B Benzo (ghi) Perylene		<25
9B Benzo (k) Fluoranthene		<10
10B Bis (2-Chloroethoxy) Methane		<10
11B Bis (2-Chloroethyl) Ether		<10
12B Bis (2-Chloroisopropyl) Ether		<10
13B Bis (2-Ethylhexyl) Phthalate		<10
14B 4-Bromophenyl Phenyl Ether		<10
15B Butyl Benzyl Phthalate		<10
16B 2-Chloronaphthalene		<10
17B 4-Chlorophenyl Phenyl Ether		<10
18B Chrysene		<10
19B Dibenzo (a,h) Anthracene		<25
20B 1,2-Dichlorobenzene		<10
21B 1,3-Dichlorobenzene		<10
22B 1,4-Dichlorobenzene		<10
23B 3,3'-Dichlorobenzidine		<10
24B Diethyl Phthalate		<10
25B Dimethyl Phthalate		<10
26B Di-N-Butyl Phthalate		<10
27B 2,4-Dinitrotoluene		<10
28B 2,6-Dinitrotoluene		<10
29B Di-N-Octyl Phthalate		<10
30B 1,2-Diphenylhydrazine (as Azobenzene)		<10
31B Fluoranthene		<10
32B Fluorene		<10
33B Hexachlorobenzene		<10
34B Hexachlorobutadiene		<10
35B Hexachloro-cyclopentadiene		<10
36B Hexachloroethane		<10
37B Indeno (1,2,3 cd) Pyrene		<25

DETERMINATION	A µg/l	B µg/l
Part V-C (Con't)		
38B Isophorone		<10
39B Naphthalene		<10
40B Nitrobenzene		<10
41B N-Nitrosodi-methylamine		<50
42B N-Nitrosodi-N-Propylamine		<10
43B N-Nitrosodi-phenylmine		<10
44B Phenanthrene		<10
45B Pyrene		<10
46B 1,2,4-Trichloro-benzene		<10
GC/EC Fraction Pesticides		NA
1P Aldrin		<10
2P α BHC		<10
3P β BHC		<10
4P γ BHC		<10
5P δ BHC		<10
6P Chlordane		<20
7P 4-4' DDT		<10
8P 4-4' DDE		<10
9P 4-4' DDD		<10
10P Dieldrin		<10
11P α Endosulfan		<10
12P β Endosulfan		<10
13P Endosulfan Sulfate		<10
14P Endrin		<10
15P Endrin Aldehyde		<20
16P Heptachlor		<10
17P Heptachlor Epoxide		<10
18P PCB-1242		<40
19P PCB-1254		<40
20P PCB-1221		<40
21P PCB-1232		<40
22P PCB-1248		<40
23P PCB-1260		<40
24P PCB-1016		<40
25P Toxaphene		<20

NA - Not Applicable

	Date Extracted	Date Injected	Conc. Factor	Standard	Book & Page No.
ACID /MS					
GC/MS	------	7/22/81	1.0	Supelco CD Purgeables	29-81-1
PEST. GC					

AR300104

WL 4 78

NUS CORPORATION

CYRUS WM. RICE DIVISION

A .ALYTICAL SERVICES LABORATORY
15 NOBLE AVENUE • PITTSBURGH, PA. 15205
412-343-9200

Project No. 0
Date Received 7-10-81
Date Sampled 7-09-81

Rice Sample No. 11070347
Project Mgr. D.P. Bour
Time 3 PM
Date Reported 8-19-81

HERCULES, INCORPORATED
Picco Resins
120 State Street
Clairton, PA 15025

Attn: John Y. Penn

S ple Source 7391-36 Well #3 2:55 PM

Test results reported in ug/l unless otherwise noted. P.O. #031-17469

Rice Sample No.			
	Endrin	<	0.01
	Lindane	<	0.005
	Methoxychlor	<	0.05
	Toxaphene	<	0.25
	Styrene	<	1 mg/l

AR300105

). TASK MO DAY RICE NBR IDENT TYPE AMOUNT

WL 2-7

NUS CORPORATION
CYRUS WM. RICE DIVISION
ANALYTICAL SERVICES LABORATORY
NOBLE AVENUE • PITTSBURGH, PA. 15205
412-343-9200

Project No. 0
Date Received 7-10-81
Date Sampled 7-09-81

Rice Sample No. 11070347
Project Mgr. D.P. Bour
Time 3 PM
Date Reported 8-19-81

HERCULES, INCORPORATED
Picco Resins
120 State Street
Clairton, PA 15025

Attn: John Y. Penn

Sample Source 7391-36 Well #3 2:55 PM

Test results reported in mg/liter unless otherwise noted. P.O. #031-17469

	DETERMINATION*	DATE	RICE	
010	Acidity Free ($CaCO_3$)			
020	Acidity Total ($CaCO_3$)			
030	Alkalinity M.O. ($CaCO_3$)		584	
040	Alkalinity Pht. ($CaCO_3$)		0	
050	Aluminum (Al)		5.1	
060	Ammonia ( )			
070	Arsenic (As)		0.008	
080	Barium (Ba)		1.1	
090	Bicarbonate ($CaCO_3$)			
100	Bio Oxygen Demand (O_2)		298	
110	Cadmium (Cd)		<0.01	
120	Calcium (Ca)			
130	Carbon Inorganic (C)			
	Carbon Organic (C)		158	
	Carbon Total (C)			
160	Carbonate (CO_3)			
170	Chem. Oxygen Dem. (O_2)		555	
180	Chloride (Cl)		175	
190	Chromate (CrO_4)			
200	Chromium (Cr^{+6})			
210	Chromium Total (Cr)		<0.03	
220	Color (APHA)			
230	Copper (Cu)			
240	Cyanide Free (CN)			
250	Cyanide Total (CN)		<0.005	
260	Fluoride (F)		6.8	
270	Hardness ($CaCO_3$)			
280	Hydroxide (OH)			
290	Iron ( ) (Fe)			
300	Iron Total (Fe)		2.5	
310	Lead (Pb)		<0.05	
320	Magnesium (Mg)			
330	Manganese (Mn)		0.64	
340	Mercury (Hg), μg/1		<0.2	
350	Nickel (Ni)			
360	Nitrate (N)		0.4	
370	Nitrite ( )			

	DETERMINATION*	DATE	RICE	
380	Nitrogen, Kjeldahl (N)			
390	Odor, Method:			
400	pH		7.4	
410	Phenolic Cpds. (Phenol)		1.33	
420	Phosphorus Ortho ( )			
430	Phosphorus Total ( )			
440	Potassium (K)			
450	Selenium (Se)		<0.005	
460	Silica Soluble ( )			
470	Silica Total ( )			
480	Silver (Ag)		<0.02	
490	Sodium (Na)		260	
500	Solids Dissolved		960	
510	Solids Suspended		64	
520	Solids Total		1100	
530	Solids Non-Settleable			
540	Solids Settleable			
550	Solids Volatile			
560	Solvent Extract (Oil) Method:		2	
570	Sp. Cond., 25°C μmhos		1700	
580	Sulfate (SO_4)		38	
590	Sulfide (S)			
600	Surfactants (MBAS)			
610	Tin (Sn)			
620	Turbidity (JTU)			
630	Zinc (Zn)		0.83	
640	Miscellaneous			
*	T.O.H.			
	Boron		28	

*Special Instructions (Methods, Etc.)

* T.O.H. results to follow.

AR300106

TASK	MO	DAY	RICE	NBR	IDENT	TYPE	AMOUNT

NUS CORPORATION
A Halliburton Company

PROJECT NO. Q

PROJECT MGR. D P Bour

RICE SAMPLE NO. 11070348

DATE RECEIVED 7-10-81

TIME 3. PM

DATE REPORTED

DATE SAMPLED 7-9-81

CLIENT NO.

P.O.# 031-17469

Sample Source 7391-37 Well #4 2:55 PM

	DETERMINATION	mg/l			DETERMINATION	mg/l	
	FORM 2-C Part V-A				**Parts V-C**		
a	Bio. Oxygen Demand				Metals, Cyanide, & Total Phenols		
b	Chem. Oxygen Demand			1M	Antimony, Total		
c	Total Organic Carbon			2M	Arsenic, Total		
d	Total Suspended Solids			3M	Beryllium, Total		
e	Ammonia (N)			4M	Cadmium, Total		
i	pH			5M	Chromium, Total		
	Part V-B			6M	Copper, Total		
a	Bromide			7M	Lead, Total		
b	Chlorine, T. Residual			8M	Mercury, Total		
c	Color (APHA Units)			9M	Nickel, Total		
d	Fecal Coliform/100ml			10M	Selenium, Total		
e	Fluoride			11M	Silver, Total		
f	Nitrate-Nitrite (N)			12M	Thallium, Total		
g	Nitrogen, T. Organic (N)			13M	Zinc, Total		
h	Oil and Grease			14M	Cyanide, Total		
i	Phosphorus, T. (P)			15M	Phenols, Total		
k	Sulfate (SO_4)						
l	Sulfide (S)						
m	Sulfite (SO_3)				DIOXIN		
n	Surfactants				2,3,7,8 Tetrachlorodibenzo-P-dioxin (Screening)		
o	Aluminum, Total						
p	Barium, Total						
q	Boron, Total						
r	Cobalt, Total						
s	Iron, Total						
t	Magnesium, Total						
u	Molybdenum, Total						
v	Manganese, Total						
w	Tin, Total						
x	Titanium, Total						

On page 3, Column B lists the minimum working limits which are normally reported. If a blank occurs in Column A of a requested determination, the limit in Column B should be used for permit application and compliance reports.

AR300107

Rice# 11070348
Deat Reported 7-30-81

DETERMINATION	A µg/l	B µg/l
Part V-C (Con't)		
GC/MS Fraction-Volatile Compounds		
Acrolein		<100
Acrylonitrile		<100
3V Benzene	6	<10
4V Bis (Chloromethyl) Ether		<10
5V Bromoform		<10
6V Carbon Tetrachloride		<10
7V Chlorobenzene		<10
8V Chlorodibromomethane		<10
9V Chloroethane		<10
.0V 2-Chloroethylvinyl Ether		<10
11V Chloroform	< 1	<10
2V Dichlorobromomethane		<10
3V Dichlorodifluoromethane		<10
14V 1,1-Dichloroethane		<10
15V 1,2-Dichloroethane		<10
6V 1,1-Dichloroethylene		<10
7V 1,2-Dichloropropane		<10
18V 1,3-Dichloropropylene		<10
9V Ethylbenzene	4	<10
0V Methyl Bromide		<10
21V Methyl Chloride		<10
2V Methylene Chloride	7	<10
3V 1,1,2,2-Tetrachloroethane		<10
24V Tetrachloroethylene		<10
25V Toluene	11	<10
1,2-Trans-Dichloroethylene		<10
27V 1,1,1-Trichloroethane		<10
V 1,1,2-Trichloroethane		<10
9V Trichloroethylene		<10
30V Trichlorofluoromethane		<10
31V Vinyl chloride		<10
GC/MS Fraction — Acid Compounds		NA
1A 2-Chlorophenol		<25
2A 2,4-Dichlorophenol		<25
3A 2,4-Dimethylphenol		<25
4A 4,6-Dinitro-o-cresol		<250
5A 2,4-Dinitrophenol		<250
6A 2-Nitrophenol		<25
7A 4-Nitrophenol		<25
8A p-Chloro-m-cresol		<25
9A Pentachlorophenol		<25
0A Phenol		<25
1A 2,4,6-Trichlorophenol		<25
GC/MS Fraction Base Neutral Compounds NA		
1B Acenaphthene		<10

DETERMINATION	A µg/l	B µg/l
Part V-C (Con't)		
2B Acenaphthylene		<10
3B Anthracene		<10
4B Benzidine		<10
5B Benzo (a) Anthracene		<10
6B Benzo (a) Pyrene		<10
7B 3,4-Benzofluoranthene		<10
8B Benzo (ghi) Perylene		<25
9B Benzo (k) Fluoranthene		<10
10B Bis (2-Chloroethoxy) Methane		<10
11B Bis (2-Chloroethyl) Ether		<10
12B Bis (2-Chloroisopropyl) Ether		<10
13B Bis (2-Ethylhexyl) Phthalate		<10
14B 4-Bromophenyl Phenyl Ether		<10
15B Butyl Benzyl Phthalate		<10
16B 2-Chloronaphthalene		<10
17B 4-Chlorophenyl Phenyl Ether		<10
18B Chrysene		<10
19B Dibenzo (a,h) Anthracene		<25
20B 1,2-Dichlorobenzene		<10
21B 1,3-Dichlorobenzene		<10
22B 1,4-Dichlorobenzene		<10
23B 3,3'-Dichlorobenzidine		<10
24B Diethyl Phthalate		<10
25B Dimethyl Phthalate		<10
26B Di-N-Butyl Phthalate		<10
27B 2,4-Dinitrotoluene		<10
28B 2,6-Dinitrotoluene		<10
29B Di-N-Octyl Phthalate		<10
30B 1,2-Diphenylhydrazine (as Azobenzene)		<10
31B Fluoranthene		<10
32B Fluorene		<10
33B Hexachlorobenzene		<10
34B Hexachlorobutadiene		<10
35B Hexachloro-cyclopentadiene		<10
36B Hexachloroethane		<10
37B Indeno (1,2,3 cd) Pyrene		<25

DETERMINATION	A µg/l	B µg/l
Part V-C (Con't)		
38B Isophorone		<10
39B Naphthalene		<10
40B Nitrobenzene		<10
41B N-Nitrosodi-methylamine		<50
42B N-Nitrosodi-N-Propylamine		<10
43B N-Nitrosodi-phenylmine		<10
44B Phenanthrene		<10
45B Pyrene		<10
46B 1,2,4-Trichloro-benzene		<10
GC/EC Fraction Pesticides		NA
1P Aldrin		<10
2P α BHC		<10
3P β BHC		<10
4P γ BHC		<10
5P δ BHC		<10
6P Chlordane		<20
7P 4-4' DDT		<10
8P 4-4' DDE		<10
9P 4-4' DDD		<10
10P Dieldrin		<10
11P α Endosulfan		<10
12P β Endosulfan		<10
13P Endosulfan Sulfate		<10
14P Endrin		<10
15P Endrin Aldehyde		<20
16P Heptachlor		<10
17P Heptachlor Epoxide		<10
18P PCB-1242		<40
19P PCB-1254		<40
20P PCB-1221		<40
21P PCB-1232		<40
22P PCB-1248		<40
23P PCB-1260		<40
24P PCB-1016		<40
25P Toxaphene		<20

NA - Not Applicable

	Date Extracted	Date Injected	Conc. Factor	Standard	Book & Page No.
ACID GC/MS					
BN GC/MS					
GC/MS	-------	7/22/81	1.0	Supelco CD Purgeables	29-81-1
PEST. GC					

AR300108

NUS CORPORATION
CYRUS WM RICE DIVISION
ALYTICAL SERVICES LABORATORY
15 NOBLE AVENUE • PITTSBURGH, PA. 15205
412-343-9200

Rice Sample No. 11070348
Project No. 9
Project Mgr. D.P. Bour
Date Received 7-10-81
Time 3 PM
Date Sampled 7-09-81
Date Reported 8-19-81

HERCULES, INCORPORATED
Picco Resins
120 State Street
Clairton, PA 15025

Attn: John Y. Penn

Sample Source 7391-37 Well #4 1:47 PM

Test results reported in mg/liter unless otherwise noted. P.O. #031-17469

	DETERMINATION*	DATE	RICE	
010	Acidity Free ($CaCO_3$)			
020	Acidity Total ($CaCO_3$)			
030	Alkalinity M.O. ($CaCO_3$)		413	
040	Alkalinity Pht. ($CaCO_3$)		0	
050	Aluminum (Al)		0.4	
060	Ammonia ( )			
070	Arsenic (As)		<0.005	
080	Barium (Ba)		<2	
090	Bicarbonate ($CaCO_3$)			
100	Bio Oxygen Demand (O_2)		17	
110	Cadmium (Cd)		<0.01	
120	Calcium (Ca)			
130	Carbon Inorganic (C)			
140	Carbon Organic (C)		<1	
150	Carbon Total (C)			
160	Carbonate (CO_3)			
170	Chem. Oxygen Dem. (O_2)		51	
180	Chloride (Cl)		106	
190	Chromate (CrO_4)			
200	Chromium (Cr^{+6})			
210	Chromium Total (Cr)		<0.03	
220	Color (APHA)			
230	Copper (Cu)			
240	Cyanide Free (CN)			
250	Cyanide Total (CN)		<0.005	
260	Fluoride (F)		1.9	
270	Hardness ($CaCO_3$)			
280	Hydroxide (OH)			
290	Iron ( ) (Fe)			
300	Iron Total (Fe)		0.53	
310	Lead (Pb)		<0.05	
320	Magnesium (Mg)			
330	Manganese (Mn)		0.32	
340	Mercury (Hg), µg/1		<0.2	
350	Nickel (Ni)			
360	Nitrate (N)		0.5	
370	Nitrite ( )			

	DETERMINATION*	DATE	RICE	
380	Nitrogen, Kjeldahl (N)			
390	Odor, Method:			
400	pH		7.3	
410	Phenolic Cpds. (Phenol)		0.019	
420	Phosphorus Ortho ( )			
430	Phosphorus Total ( )			
440	Potassium (K)			
450	Selenium (Se)		<0.005	
460	Silica Soluble ( )			
470	Silica Total ( )			
480	Silver (Ag)		<0.02	
490	Sodium (Na)		60	
500	Solids Dissolved		780	
510	Solids Suspended		1	
520	Solids Total		820	
530	Solids Non-Settleable			
540	Solids Settleable			
550	Solids Volatile			
560	Solvent Extract (Oil) Method:		<1	
570	Sp. Cond., 25° C µmhos		1300	
580	Sulfate (SO_4)		103	
590	Sulfide (S)			
600	Surfactants (MBAS)			
610	Tin (Sn)			
620	Turbidity (JTU)			
630	Zinc (Zn)		0.03	
640	Miscellaneous			
*	T.O.H.			
	Boron		6.6	

*Special Instructions (Methods, Etc.)

* T.O.H. results to follow.

AR300109

TASK	MO	DAY	RICE	NBR	IDENT	TYPE	AMOUNT
7 10	11 12	2?	25 26	33	35 47	50 54	56 63

NUS CORPORATION
CYRUS WM. RICE DIVISION
ANALYTICAL SERVICES LABORATORY
15 NOBLE AVENUE • PITTSBURGH, PA. 15205
412-343-9200

Rice Sample No. 11070348
Project No. 0 | Project Mgr. D.P. Bour
Date Received 7-10-81 | Time 3 PM
Date Sampled 7-09-81 | Date Reported 8-19-81

HERCULES, INCORPORATED
Picco Resins
120 State Street
Clairton, PA 15025

Attn: John Y. Penn

Sample Source 7391-36 Well-#4 1:47 PM

Test results reported in ug/l unless otherwise noted. P.O. #031-17469

Rice Sample No.		
	Endrin	< 0.01
	Lindane	< 0.005
	Methoxychlor	< 0.05
	Toxaphene	< 0.25
	Styrene	< 1 mg/l

AR300110

ROJ		TASK	MO	DAY	RICE	NBR	IDENT		TYPE		AMOUNT	
7	10	11 12	22	25	26	33	35	47	50	54	56	63

ANALYSIS OF

MONITOR WELL SAMPLES

APRIL, 1982

U.S. ENVIRONMENTAL PROTECTION AGENCY - HWI Sample Management Office
P.O. Box 818, Alexandria, VA 2231 - 703/683-9885

Case [illegible]
Sample
C 1396

ORGANICS ANALYSIS DATA SHEET

Picco [illegible]

LABORATORY NAME ENERGY RESOURCES CO. INC.

LAB SAMPLE ID NO. 25-350 TW-1

QC REPORT NO. 15

Sample 5 [illegible]
Well 1 [illegible]
South of
disposal area

ACID COMPOUNDS

		ug/l
21A	2,4,6- trichlorophenol	ND
22A	p-chloro-m-cresol	ND
24A	2- chlorophenol	ND
31A	2,4-dichlorophenol	ND
34A	2,4-dimethylphenol	ND
57A	2- nitrophenol	ND
58A	4- nitrophenol	ND
59A	2,4- dinitrophenol	ND
60A	4,6- dinitro-o-cresol	ND
[illegible]A	pentachlorophenol	ND
[illegible]	phenol	ND

BASE/NEUTRAL COMPOUNDS

		ug/l
1B	acenaphthene	ND
5B	benzidine	ND
8B	1,2,4- trichlorobenzene	ND
9B	hexachlorobenzene	ND
12B	hexachloroethane	ND
18B	bis(2-chloroethyl)ether	ND
20B	2-chloronaphthalene	ND
25B	1,2-dichlorobenzene	ND
26B	1,3-dichlorobenzene	ND
27B	1,4-dichlorobenzene	ND
28B	3,3'-dichlorobenzidine	ND
35B	2,4- dinitrotoluene	ND
[illegible]B	2,6- dinitrotoluene	ND
[illegible]	1,2- diphenylhydrazine (as azobenzene)	ND
39B	fluoranthene	ND
40B	4- chlorophenyl phenyl ether	ND

BASE/NEUTRAL COMPOUNDS

41B	4-bromophenyl phenyl ether	
42B	bis (2-chloroisopropyl) ether	
43B	bis (2-chloroethoxy) methane	
52B	hexachlorobutadiene	
53B	hexachlorocyclopentadiene	
54B	isophorone	
55B	naphthalene	
56B	nitrobenzene	
61B	N-nitrosodimethylamine	
62B	N-nitrosodiphenylamine	
63B	N-nitrosodi-n-propylamine	
66B	bis (2-ethylhexyl) phthalate	
67B	butyl benzyl phthalate	
68B	di-n-butyl phthalate	
69B	di-n-octyl phthalate	
70B	diethyl phthalate	
71B	dimethyl phthalate	
72B	benzo(a)anthracene	
73B	benzo(a)pyrene	
74B	3,4-benzofluoranthene	
75B	benzo(k)fluoranthene	
76B	chrysene	
77B	acenaphthylene	
78B	anthracene	
79B	benzo(ghi)perylene	
80B	fluorene	
81B	phenanthrene	
82B	dibenzo(a,h)anthracene	
83B	indeno(1,2,3-cd)pyrene	
84B	pyrene	

AR300112

Case 1[illegible]
Sample No.
C 1396

ORGANICS ANALYSIS DATA SHEET - Page 2

LABORATORY NAME ENERGY RESOURCES CO. INC.

LAB SAMPLE ID NO. 25-350 TW-1

QC REPORT NO. 15

	VOLATILES	ug/l
2V	acrolein	ND
V	acrylonitrile	ND
4V	benzene	77
V	carbon tetrachloride	ND
7V	chlorobenzene	ND
[illegible]V	1,2-dichloroethane	ND
11V	1,1,1-trichloroethane	ND
[illegible]V	1,1-dichloroethane	ND
14V	1,1,2-trichloroethane	ND
[illegible]V	1,1,2,2-tetrachloroethane	ND
[illegible]	chloroethane	ND
[illegible]9V	2-chloroethylvinyl ether	ND
V	chloroform	ND
29V	1,1-dichloroethylene	ND
V	1,2-trans-dichloroethylene	ND
32V	1,2-dichloropropane	ND
V	1,3-dichloropropylene	ND
38V	ethylbenzene	ND
V	methylene chloride	ND
45V	methyl chloride	ND
V	methyl bromide	ND
47V	bromoform	ND
[illegible]	dichlorobromomethane	ND
4[illegible]V	trichlorofluoromethane	ND
[illegible]	dichlorodifluoromethane	ND
51V	chlorodibromomethane	ND
[illegible]	tetrachloroethylene	1,000
8[illegible]V	toluene	130
8[illegible]V	trichloroethylene	ND
8[illegible]	vinyl chloride	ND

	PESTICIDES	
89P	aldrin	
90P	dieldrin	
91P	chlordane	
92P	4,4'-DDT	
93P	4,4'-DDE	
94P	4,4'-DDD	
95P	α -endosulfan	
96P	β -endosulfan	
97P	endosulfan sulfate	
98P	endrin	
99P	endrin aldehyde	
100P	heptachlor	
101P	heptachlor epoxide	
102P	α -BHC	
103P	β -BHC	
104P	δ -BHC	
105P	γ -BHC	
106P	PCB-1242	*
107P	PCB-1254	*
108P	PCB-1221	*
109P	PCB-1232	*
110P	PCB-1248	*
111P	PCB-1260	*
112P	PCB-1016	*
113P	toxaphene	*

AR300113

	DIOXINS	
129B	2,3,7,8-tetrachlorodibenzo-p-dioxin	*

*Less than 10 ug/l
(pesticides less than 0.1 ug/l)

[illegible] ENVIRONMENTAL PROTECTION AGENCY - [illegible] Sample Management Office
P.O. [illegible], Alexandria, VA 2231. - 703/683-0885

Case [illegible]
Sample
C 1395

ORGANICS ANALYSIS DATA SHEET

PICCO [illegible]

LABORATORY NAME ENERGY RESOURCES CO. INC.

LAB SAMPLE ID NO. 25-349 TW-2

QC REPORT NO. 15

Sample 4
Well 2
southwest
of disposal area

NKH

ACID COMPOUNDS		ug/l
21A	2,4,6- trichlorophenol	ND
22A	p-chloro-m-cresol	ND
24A	2- chlorophenol	ND
31A	2,4-dichlorophenol	ND
34A	2,4- dimethylphenol	ND
57A	2- nitrophenol	ND
58A	4- nitrophenol	ND
59A	2,4- dinitrophenol	ND
60A	4,6- dinitro-o-cresol	ND
[illegible]A	pentachlorophenol	ND
[illegible]A	phenol	16

BASE/NEUTRAL COMPOUNDS		
1B	acenaphthene	ND
5B	benzidine	ND
8B	1,2,4- trichlorobenzene	ND
9B	hexachlorobenzene	ND
12B	hexachloroethane	ND
18B	bis(2-chloroethyl)ether	ND
20B	2-chloronaphthalene	ND
25B	1,2-dichlorobenzene	ND
26B	1,3-dichlorobenzene	ND
27B	1,4-dichlorobenzene	ND
28B	3,3'-dichlorobenzidine	ND
[illegible]B	2,4- dinitrotoluene	ND
[illegible]	2,6- dinitrotoluene	ND
37B	1,2- diphenylhydrazine (as azobenzene)	ND
39B	fluoranthene	ND
40B	4- chlorophenyl phenyl ether	ND

BASE/NEUTRAL COMPOUNDS		
41B	4-bromophenyl phenyl ether	
42B	bis (2-chloroisopropyl) ether	
43B	bis (2-chloroethoxy) methane	
52B	hexachlorobutadiene	
53B	hexachlorocyclopentadiene	
54B	isophorone	
55B	naphthalene	4
56B	nitrobenzene	
61B	N-nitrosodimethylamine	
62B	N-nitrosodiphenylamine	
63B	N-nitrosodi-n-propylamine	
66B	bis (2-ethylhexyl) phthalate	
67B	butyl benzyl phthalate	
68B	di-n-butyl phthalate	
69B	di-n-octyl phthalate	
70B	diethyl phthalate	
71B	dimethyl phthalate	
72B	benzo(a)anthracene	
73B	benzo(a)pyrene	
74B	3,4-benzofluoranthene	
75B	benzo(k)fluoranthene	
76B	chrysene	
77B	acenaphthylene	
78B	anthracene/phenanthrene	
79B	benzo(ghi)perylene	
80B	fluorene	
81B	phenanthrene see 78B	
82B	dibenzo(a,h)anthracene	
83B	indeno(1,2,3-cd)pyrene	
84B	pyrene	

AR300114

Case 11-2-
Sample No.
C 139

ORGANICS ANALYSIS DATA SHEET - Page 2

LABORATORY NAME ENERGY RESOURCES CO. INC.

LAB SAMPLE ID NO. 25-349 TW-2

QC REPORT NO. 15

	VOLATILES	ug/l
V	acrolein	ND
V	acrylonitrile	ND
V	benzene	200
V	carbon tetrachloride	ND
7V	chlorobenzene	ND
V	1,2-dichloroethane	ND
11V	1,1,1-trichloroethane	ND
3V	1,1-dichloroethane	ND
14V	1,1,2-trichloroethane	ND
5V	1,1,2,2-tetrachloroethane	ND
16	chloroethane	ND
V	2-chloroethylvinyl ether	ND
23V	chloroform	ND
V	1,1-dichloroethylene	ND
30V	1,2-trans-dichloroethylene	ND
V	1,2-dichloropropane	ND
V	1,3-dichloropropylene	ND
38V	ethylbenzene	ND
V	methylene chloride	ND
45V	methyl chloride	ND
V	methyl bromide	ND
47V	bromoform	ND
V	dichlorobromomethane	ND
49V	trichlorofluoromethane	ND
V	dichlorodifluoromethane	ND
51V	chlorodibromomethane	ND
V	tetrachloroethylene	ND
86V	toluene	870
V	trichloroethylene	ND
88V	vinyl chloride	ND

	PESTICIDES	
89P	aldrin	
90P	dieldrin	
91P	chlordane	
92P	4,4'-DDT	
93P	4,4'-DDE	
94P	4,4'-DDD	
95P	α -endosulfan	
96P	β -endosulfan	
97P	endosulfan sulfate	
98P	endrin	
99P	endrin aldehyde	
100P	heptachlor	
101P	heptachlor epoxide	
102P	α -BHC	
103P	β -BHC	
104P	δ -BHC	
105P	γ -BHC	
106P	PCB-1242	
107P	PCB-1254	
108P	PCB-1221	
109P	PCB-1232	
110P	PCB-1248	
111P	PCB-1260	
112P	PCB-1016	
113P	toxaphene	

AR300115

	DIOXINS	
129B	2,3,7,8-tetrachlorodibenzo-p-dioxin	

*Less than 10 ug/l

WEST COAST ⁻ ⁻CHNICAL SERVICE INC. INDUS⁻RIAL CATEGORY ______

TW-3 PH

SAMPLE ID	C1328	SAMPLE ID	C1328 Sample 6
LAB ID	23709A3	LAB ID	23709B5 & 23709B7
DATE EXTRACTED	5-22-82	DATE EXTRACTED	5-21-82
DATE INJECTED	6-22-82	DATE INJECTED	6-19-82
STD ID	SENS265 PHEN425	STD ID	BENZ580 BNSTD578
CONC FACTOR	1000	CONC FACTOR	1000 & 50

Acid Compounds		ug/l
21A	2,4,6-trichlorophenol	ND
22A	p-chloro-m-cresol	ND
24A	2-chlorophenol	ND
31A	2,4-dichlorophenol	ND
34A	2,4-dimethylphenol	240
57A	2-nitrophenol	ND
58A	4-nitrophenol	ND
59A	2,4-dinitrophenol	ND
60A	4,6-dinitro-o-cresol	ND
64A	pentachlorophenol	ND
65A	phenol	100

Base/Neutral Compounds		ug/l
1B	acenaphthene	ND
5B	benzidine	ND
8B	1,2,4-trichlorobenzene	ND
9B	hexachlorobenzene	ND
12B	hexachloroethane	ND
18B	bis(2-chloroethyl)ether	ND
20B	2-chloronapthalene	ND
25B	1,2-dichlorobenzene	ND
26B	1,3-dichlorobenzene	ND
27B	1,4-dichlorobenzene	ND
28B	3,3'-dichlorobenzidine	ND
35B	2,4-dinitrotoluene	ND
36B	2,6-dinitrotoluene	ND
37B	1,2-diphenylhydrazine (as azobenzene)	ND
39B	fluoranthene	ND
40B	4-chlorophenyl phenyl ether	ND
41B	4-bromophenyl phenyl ether	ND
42B	bis(2-chloroisopropyl) ether	ND
43B	bis (2-chloroethoxy) methane	ND
52B	hexachlorobutadiene	ND
53B	hexachlorocyclopentadiene	ND
54B	isophorone	ND
55B	naphthalene	1900
56B	nitrobenzene	ND
61B	N-nitrosodimethylamine	ND
62B	N-nitrosodiphenylamine	ND
63B	N-nitrosodi-n-propylamine	ND
66B	bis (2-ethylhexyl) phthalate	*
67B	butyl benzyl phthalate	ND
68B	di-n-butyl phthalate	*
69B	di-n-octyl phthalate	ND
70B	diethyl phthalate	ND
71B	dimethyl phthalate	ND
72B	benzo(a) anthracene	ND
73B	benzo(a)pyrene	ND
74B	3,4-benzofluoranthene	ND
75B	benzo(k)fluoranthene	ND
76B	chrysene	ND
77B	acenaphthylene	ND
78B	anthracene	ND
79B	benzo(ghi)perylene	ND
80B	fluorene	ND
81B	phenanthrene	ND
82B	dibenzo(a,h) anthracene	ND
83B	indeno(1,2,3-cd)pyrene	ND
84B	pyrene	ND
129B	2,3,7,8-tetrachlorodibenzo-p-dioxin	ND

AR300116

AR300116

WEST COAST CHNICAL SERVICE INC. INDU' 'RIAL CATEGORY ________

SAMPLE ID	C1328
LAB ID	23709V15 & V17
DATE INJECTED	6-2-82
STD ID	BFB175 VOA309
CONC. FACTOR	--------

SAMPLE ID	C1328 TW-3
LAB ID	TRACE #7178
DATE EXTRACTED	5-22-82
DATE INJECTED	6-5-82
STD ID	TRACE # 7180
CONC. FACTOR	100

	Volatiles	ug/l
2V	acrolein	ND
3V	acrylonitrile	ND
4V	benzene	1700
6V	carbon tetrachloride	ND
7V	chlorobenzene	ND
10V	1,2-dichloroethane	ND
11V	1,1,1-trichloroethane	ND
13V	1,1-dichloroethane	ND
14V	1,1,2-trichloroethane	ND
15V	1,1,2,2-tetrachloroethane	ND
16V	chloroethane	ND
17V	bis(chloromethyl) ether	ND
19V	2-chloroethylvinyl ether	ND
23V	chloroform	ND
29V	1,1-dichloroethylene	ND
30V	1,2-trans-dichloroethylene	ND
32V	1,2-dichloropropane	ND
33V	1,3-dichloropropylene	ND
38V	ethylbenzene	ND
44V	methylene chloride	15
45V	methyl chloride	ND
46V	methyl bromide	ND
47V	bromoform	ND
48V	dichlorobromomethane	ND
49V	trichlorofluoromethane	ND
50V	dichlorodifluoromethane	ND
51V	chlorodibromomethane	ND
85V	tetrachloroethylene	ND
86V	toluene	3600
87V	trichloroethylene	ND
88V	vinyl chloride	ND

	Pesticides	ug/l
89P	aldrin	ND
90P	dieldrin	ND
91P	chlordane	ND
92P	4,4'-DDT	ND
93P	4,4'-DDE	ND
94P	4,4'-DDD	ND
95P	alpha-endosulfan	ND
96P	beta-endosulfan	ND
97P	endosulfan sulfate	ND
98P	endrin	ND
99P	endrin aldehyde	[illegible]
100P	heptachlor	ND
101P	heptachlor epoxide	ND
102P	alpha-BHC	ND
103P	beta-BHC	ND
104P	gamma-BHC	ND
105P	delta-BHC	ND
106P	PCB-1242	ND
107P	PCB-1254	ND
108P	PCB-1221	ND
109P	PCB-1232	ND
110P	PCB-1248	ND
111P	PCB-1260	ND
112P	PCB-1016	ND
113P	toxaphene	ND

* = Less than 10 ug/l
(pesticides less th...

ND = Not detected

** = Not confirmed by GCMS

AR300117

U.S. E[illegible] PROTECT[illegible] AGENCY - [illegible] Sample Management Office
P.O. Box 818, Alexandria, VA 2231[illegible] - 703/683-9885

Case [illegible]2
Sample
C 1393

ORGANICS ANALYSIS DATA SHEET

PICCO Hercules

LABORATORY NAME ENERGY RESOURCES CO. INC.

LAB SAMPLE ID NO. 25-348 TW-4

QC REPORT NO. 15

Sample 3
Well 4
background

ACID COMPOUNDS

		ug/l
21A	2,4,6- trichlorophenol	ND
22A	p-chloro-m-cresol	ND
24A	2- chlorophenol	ND
31A	2,4-dichlorophenol	ND
34A	2,4- dimethylphenol	ND
57A	2- nitrophenol	ND
58A	4- nitrophenol	ND
59A	2,4- dinitrophenol	ND
60A	4,6- dinitro-o-cresol	ND
[illegible]4A	pentachlorophenol	ND
65A	phenol	ND

BASE/NEUTRAL COMPOUNDS

		ug/l
1B	acenaphthene	ND
5B	benzidine	ND
8B	1,2,4- trichlorobenzene	ND
9B	hexachlorobenzene	ND
12B	hexachloroethane	ND
18B	bis(2-chloroethyl)ether	ND
20B	2-chloronaphthalene	ND
25B	1,2-dichlorobenzene	ND
26B	1,3-dichlorobenzene	ND
27B	1,4-dichlorobenzene	ND
28B	3,3'-dichlorobenzidine	ND
[illegible]B	2,4- dinitrotoluene	ND
[illegible]3	2,6- dinitrotoluene	ND
37B	1,2- diphenylhydrazine (as azobenzene)	ND
39B	fluoranthene	ND
[illegible]	[illegible]	ND

BASE/NEUTRAL COMPOUNDS

		ug/l
41B	4-bromophenyl phenyl ether	
42B	bis (2-chloroisopropyl) ether	
43B	bis (2-chloroethoxy) methane	
52B	hexachlorobutadiene	
53B	hexachlorocyclopentadiene	
54B	isophorone	
55B	naphthalene	29
56B	nitrobenzene	
61B	N-nitrosodimethylamine	
62B	N-nitrosodiphenylamine	
63B	N-nitrosodi-n-propylamine	
66B	bis (2-ethylhexyl) phthalate	
67B	butyl benzyl phthalate	
68B	di-n-butyl phthalate	
69B	di-n-octyl phthalate	
70B	diethyl phthalate	
71B	dimethyl phthalate	
72B	benzo(a)anthracene	
73B	benzo(a)pyrene	
74B	3,4-benzofluoranthene	
75B	benzo(k)fluoranthene	
76B	chrysene	
77B	acenaphthylene	
78B	anthracene	
79B	benzo(ghi)perylene	
80B	fluorene	
81B	phenanthrene	
82B	dibenzo(a,h)anthracene	
83B	indeno(1,2,3-cd)pyrene	
84B	pyrene	

AR300118

Case 10[illegible]
Sample No.
C 1393

ORGANICS ANALYSIS DATA SHEET - Page 2

LABORATORY NAME ENERGY RESOURCES CO. INC.

LAB SAMPLE ID NO. 25-348 TW-4

QC REPORT NO. 15

	VOLATILES	ug/l
[illegible]V	acrolein	ND
[illegible]V	acrylonitrile	ND
4V	benzene	38
V	carbon tetrachloride	ND
7V	chlorobenzene	ND
[illegible]V	1,2-dichloroethane	ND
11V	1,1,1-trichloroethane	ND
[illegible]V	1,1-dichloroethane	ND
14V	1,1,2-trichloroethane	ND
[illegible]V	1,1,2,2-tetrachloroethane	ND
1[illegible]	chloroethane	ND
[illegible]V	2-chloroethylvinyl ether	ND
23V	chloroform	ND
[illegible]V	1,1-dichloroethylene	ND
[illegible]V	1,2-trans-dichloroethylene	ND
[illegible]V	1,2-dichloropropane	ND
[illegible]V	1,3-dichloropropylene	ND
38V	ethylbenzene	64
[illegible]V	methylene chloride	ND
45V	methyl chloride	ND
[illegible]V	methyl bromide	ND
47V	bromoform	ND
[illegible]V	dichlorobromomethane	ND
49V	trichlorofluoromethane	ND
[illegible]V	dichlorodifluoromethane	ND
51V	chlorodibromomethane	ND
[illegible]	tetrachloroethylene	510
86V	toluene	ND
[illegible]	trichloroethylene	ND
88V	vinyl chloride	ND

	PESTICIDES	
89P	aldrin	
90P	dieldrin	
91P	chlordane	
92P	4,4'-DDT	
93P	4,4'-DDE	
94P	4,4'-DDD	
95P	α-endosulfan	
96P	β-endosulfan	
97P	endosulfan sulfate	
98P	endrin	
99P	endrin aldehyde	
100P	heptachlor	
101P	heptachlor epoxide	
102P	α-BHC	
103P	β-BHC	
104P	δ-BHC	
105P	γ-BHC	
106P	PCB-1242	[illegible]
107P	PCB-1254	[illegible]
108P	PCB-1221	[illegible]
109P	PCB-1232	[illegible]
110P	PCB-1248	[illegible]
111P	PCB-1260	[illegible]
112P	PCB-1016	[illegible]
113P	toxaphene	[illegible]

AR300119

	DIOXINS	
129B	2,3,7,8-tetrachlorodibenzo-p-dioxin	[illegible]

*Less than 10 ug/l

ANALYSIS OF

OIL FROM LEACHATE COLLECTION SYSTEM

DECEMBER, 1985

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
SEMI-VOLATILE PRIORITY POLLUTANT COMPOUNDS

CLIENT: Hercules
SAMPLE DESC: Jeff Disposal Oil
RFW #: 8512-331-0010
DATE EXTRACTED: NA
DATE ANALYZED: December 6, 1985

GCMS FILE NAME: 1206B1471
MATRIX: oil
UNITS: ug/L
DILUTION FACTOR: x100
DATE SAMPLE COLLECTED: December 5, 1985

SURROGATE RECOVERY:

2-FLUOROPHENOL	NA	NITROBENZENE-d_5	NA
PHENOL-d_5	NA	2-FLUOROBIPHENYL	NA
2,4,6-TRIBROMOPHENOL	NA	TERPHENYL-d_{14}	NA

TARGET COMPOUNDS:

N-NITROSODIMETHYLAMINE	N.D.	2,4-DINITROTOLUENE	N.D.
PHENOL	N.D	2,6-DINITROTOLUENE	N.D.
BIS(2-CHLOROETHYL)ETHER	N.D	DIETHYLPHTHALATE	N.D.
2-CHLOROPHENOL	N.D.	CHLOROPHENYL-PHENYLETHER	N.D.
1,3-DICHLOROBENZENE	N.D.	FLUORENE	N.D.
1,4-DICHLOROBENZENE	N.D.	4,6-DINITRO-2-METHYLPHENOL(2)	N.D.
1,2-DICHLOROBENZENE	N.D.	N-NITROSODIPHENYLAMINE(1)	N.D.
BIS(2-CHLOROISOPROPYL)ETHER	N.D.	4-BROMOPHENYL-PHENYLETHER	N.D.
N-NITROSO-DI-N-PROPYLAMINE	N.D.	HEXACHLOROBENZENE	N.D.
HEXACHLOROETHANE	N.D.	PENTACHLOROPHENOL(2)	N.D.
NITROBENZENE	N.D.	PHENANTHRENE	180J
ISOPHORONE	N.D.	ANTHRACENE	N.D.
2-NITROPHENOL	N.D.	DI-N-BUTYLPHTHALATE	N.D.
2,4-DIMETHYLPHENOL	N.D.	FLUORANTHENE	N.D.
BIS(2-CHLOROETHOXY)METHANE	N.D.	BENZIDINE(2)	N.D.
2,4-DICHLOROPHENOL	N.D.	PYRENE	N.D.
1,2,4-TRICHLOROBENZENE	N.D.	BUTYLBENZYLPHTHALATE	N.D.
NAPHTHALENE	18,000	3,3'-DICHLOROBENZIDINE(3)	N.D.
HEXACHLOROBUTADIENE	N.D.	BENZO(A)ANTHRACENE	N.D.
4-CHLORO-3-METHYLPHENOL	N.D.	BIS(2-ETHYLHEXYL)PHTHALATE	N.D.
HEXACHLOROCYCLOPENTADIENE	N.D.	CHRYSENE	N.D.
2,4,6-TRICHLOROPHENOL	N.D.	DI-N-OCTYLPHTHALATE	N.D.
2-CHLORONAPHTHALENE	N.D.	BENZO(B)FLUORANTHENE	N.D.
DIMETHYL PHTHALATE	N.D.	BENZO(K)FLUORANTHENE	N.D.
ACENAPHTHYLENE	N.D.	BENZO(A)PYRENE	N.D.
ACENAPHTHENE	N.D.	INDENO(1,2,3-CD)PYRENE	N.D.
2,4-DINITROPHENOL(2)	N.D.	DIBENZ(A,H)ANTHRACENE	N.D.
4-NITROPHENOL(2)	N.D.	BENZO(G,H,I)PERYLENE	N.D.

(1) CANNOT BE SEPARATED FROM DIPHENYLAMINE
LIMIT OF DETECTION = 10x D.F. EXCEPT AS NOTED:
(2) 50x D.F.
(3) 20x D.F.

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: December 10, 1985

APPROVED BY: Earl M. Hansen
Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR300121

Note: Sample was biphase;analysis was performed on upper phase (oil); Method was EPA 625.

DATE OF REPORT: December 11, 1985

DATA SUMMARY FOR: Hercules

R.F.W. NO.: 8512-331-0010

SAMPLE DESCRIPTION: Jeff Disposal Oil

TENTATIVELY IDENTIFIED COMPOUNDS

COMPOUND NAME	SCAN NUMBER	ESTIMATED CONCENTRATION, ug/L
C_3 benzenes	---	34000
C_4 benzenes	---	22000
Indole	---	16000
Methyl Naphthalenes	---	2900
Aliphatic hydrocarbons in C_8-C_{12} range	---	---